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UK METEOROLOGICAL OFFICE GLOBAL DATA MONITORING REPORT

September, 93

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1. Introduction

As the WMO-appointed lead centre for monitoring surface marine data, the U.K. Meteorological Office produces monthly statistics on the quality of these observations received at RSMC Bracknell. This report includes this information along with statistics for most other types of data. The figures and tables contained herein are presented according to the agreed standards for the exchange of monitoring results.

The report is based on data received at the UK Meteorological Office Headquarters, Bracknell in time for inclusion into the appropriate analysis. The evaluation of data quality is based on comparison with the appropriate 6-hour global model forecast (background field). Generally, the background field is of high quality except in data sparse areas, tropical regions and areas close to steep orography where care should be taken in interpreting the statistics shown.

Comments or queries on the report are welcome and should be addressed to:-

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2 Global Data Monitoring Statistics

Ships, Fixed buoys, Platforms and Drifting buoys observations

TABLES 1-2 contain lists of the stations which are considered to have returned suspect observations of pressure, windspeed, wind direction or temperature, as appropriate, during the month. The criteria for quality control are given on the header page for each table.

Figures 1 and 2 show 10 degree lat/long box average numbers of SHIP/SYNOP and DRIBU observations received per day throughout the month at Bracknell and assimilated into model runs. Only data from the main hours of 00 UTC, 06 UTC, 12 UTC and 18 UTC are included. Box average values are plotted as the nearest whole number (values of x.5 are rounded up). Where the average is more than 999, then 999 is plotted. A box with no observations is blank. If the 24 hour average >0 but <0.5, then 0 is plotted.

Aircraft observations

TABLE 3 contains a list of statistics calculated from data received from all airline carriers.

Figure 3 shows 10 degree lat/long box average numbers of AIREP/ASDAR reports received per day throughout the month at Bracknell and assimilated into model runs in the layer 70-500 hPa. Observations with a vector wind difference (compared with the model background field) of >60 m s^{-1} have been excluded. Box average values are plotted as the nearest whole number (values of x.5 are rounded up). Where the average is more than 999, then 999 is plotted. A box with no observations is blank. If the 24 hour average >0 but <0.5, then 0 is plotted.

Figures 4-7 show wind statistics for AIREP/ASDAR in the layer 70-500 hPa. Observations with a vector wind difference > 60 m s^{-1} have been excluded. Statistics have not been calculated for 10 degree lat/long boxes containing <31 observations.

Figure	Parameter
4	Mean wind vectors
5	Mean observation - background wind vector
6	Mean observation-background speed (m s^{-1})
7	RMS observation-background vector (m s^{-1})

Radiosonde Observations

TABLES 4-6 contain lists of the stations which are considered to have returned suspect observations of geopotential height, vector wind or wind direction, as appropriate, during the month. The criteria for quality control are given on the header page for each table.

Figures 8 and 9 show 10 degree lat/long box average numbers of TEMP 500 hPa GEOPOTENTIAL HEIGHT and TEMP 300 hPa WIND observations received per day throughout the month at Bracknell and assimilated into model runs. Data from all hours are included. Box average values are plotted as the nearest whole number (values of x.5 are rounded up). Where the average is more than 999, then 999 is plotted. A box with no observations is blank. If the 24 hour average >0 but <0.5, then 0 is plotted.

APPENDIX I shows details of the gross error limits used in TABLES 4 and 5 and the weights used in the RMS values in TABLE 4.

Satellite Observations

Figures 10-24 show satellite wind statistics for all geostationary satellites. All plots other than **AVAILABILITY** show average data where there are > 10 observations in a 10 degree lat/long box.

Figure	Parameter Plotted	Layer (hPa)
10	Availability/average daily number	701-1000
11	Vector mean wind (observed)	701-1000
12	Observation-background vector wind difference	701-1000
13	Mean observation-background speed differences	701-1000
14	RMS observation-background vector difference	701-1000
15	Availability/average daily number	401-700
16	Vector mean wind (observed)	401-700
17	Observation-background vector wind difference	401-700
18	Mean observation-background speed differences	401-700
19	RMS observation-background vector difference	401-700
20	Availability/average daily number	101-400
21	Vector mean wind (observed)	101-400
22	Observation-background vector wind difference	101-400
23	Mean observation-background speed differences	101-400
24	RMS observation-background vector difference	101-400

Figures 25-27 show satellite mean observation-background temperature differences for NOAA-11 soundings at 500 km resolution and figures 28-30 show the same statistics for NOAA-12. Data are plotted where there are > 30 observations in a 10 degree lat/long box.

Figure	Layer (hPa)
25/28	850-1000
26/29	100-300
27/30	30-50

TABLE 1

MONITORING OF MARINE SURFACE OBSERVATIONS
MONTHLY SUSPECT LIST - SHIPS, FIXED BUOYS AND PLATFORMS
MONITORING CENTRE: BRACKNELL
MONTH: September, 93

Monitoring procedures

Period :One calendar month.

Data monitored :Reports from each unique identifier for ships, fixed buoys and platforms.

Standard of comparison :Background field from Bracknell global model.

Observation times :00, 06, 12, 18 UTC

Elements monitored :Mean sea level pressure (hPa).
:Wind speed (m s^{-1}).
:Wind direction (Degrees).

Parameters monitored :NOBS :Number of observations received excluding duplicates.

:NGE :Number of observations with gross errors.

:PGE :Percentage of observations with gross errors.

:SD :SD of difference of observations from background values excluding those with gross errors.

:BIAS :Mean difference of observations from background values excluding those with gross errors.
N.B. a positive bias indicates the observation is veered to the background.

:RMS :Root Mean Square difference of observations from background values excluding those with gross errors.

GROSS ERROR LIMIT :15 hPa (pressure)
:25 m s^{-1} (vector wind)

SELECTION CRITERIA :NOBS ≥ 20 ,and one or more of the following:

1. |bias| ≥ 4 hPa (pressure),
≥ 5 m s^{-1} (wind speed)
≥ 30 degrees (direction).

2. SD ≥ 6 hPa (pressure)
≥ 80 degrees (direction).

3. PGE ≥ 25.

IDENTIFIER	HOUR	ELEM	LEVEL	NOBS	NGE	PGE	SD	BIAS	RMS
MEAN SEA-LEVEL PRESSURE									
CG2844	ALL	MSLP	SUR	22	0	0	2.0	4.4	4.8
C6BT8	ALL	MSLP	SUR	66	0	0	1.2	4.4	4.6
ELPP9	ALL	MSLP	SUR	24	0	0	2.9	-6.0	6.7
ESCA	ALL	MSLP	SUR	38	0	0	2.8	9.6	10.0
EVPW	ALL	MSLP	SUR	23	7	30	1.9	-3.0	3.6
PFOH	ALL	MSLP	SUR	35	0	0	1.9	-4.2	4.7
UGPA	ALL	MSLP	SUR	21	5	24	7.3	4.6	8.6
UHUN	ALL	MSLP	SUR	21	1	5	1.8	5.3	5.6
UIIG	ALL	MSLP	SUR	38	0	0	1.2	-5.1	5.2
USZQ	ALL	MSLP	SUR	58	1	2	2.1	-5.1	5.5
UUJV	ALL	MSLP	SUR	37	0	0	1.0	-6.2	6.2
UUOD	ALL	MSLP	SUR	24	0	0	1.6	6.3	6.5
VC6749	ALL	MSLP	SUR	38	0	0	2.6	-4.7	5.4
VOCG	ALL	MSLP	SUR	26	16	62	3.4	-8.7	9.3
WCZB	ALL	MSLP	SUR	43	0	0	1.4	7.4	7.5
WTC9408	ALL	MSLP	SUR	21	0	0	4.0	4.1	5.7
WZE4928	ALL	MSLP	SUR	50	49	98	0.0	-6.8	6.8
ZCAM9	ALL	MSLP	SUR	23	0	0	2.1	5.7	6.1
3EIM3	ALL	MSLP	SUR	21	0	0	2.8	-4.9	5.6
63105	ALL	MSLP	SUR	86	0	0	0.9	-4.5	4.6
WIND SPEED									
C6JQ6	ALL	SPEED	SUR	44	0	0	2.9	5.2	5.9
LAZC2	ALL	SPEED	SUR	20	0	0	5.0	6.1	7.9
VJBE	ALL	SPEED	SUR	30	1	3	4.8	5.9	7.6
VRIZ	ALL	SPEED	SUR	26	2	8	5.0	10.5	11.7
VRSM	ALL	SPEED	SUR	25	0	0	5.4	9.2	10.7
9309	ALL	SPEED	SUR	22	0	0	4.6	8.8	10.0
WIND DIRECTION									
C6KB4	ALL	DIRN.	SUR	24	0	0	32.5	30.8	44.7
DCG2959D	ALL	DIRN.	SUR	30	0	0	84.0	-5.1	84.1
VGFP	ALL	DIRN.	SUR	25	0	0	42.1	37.8	56.5

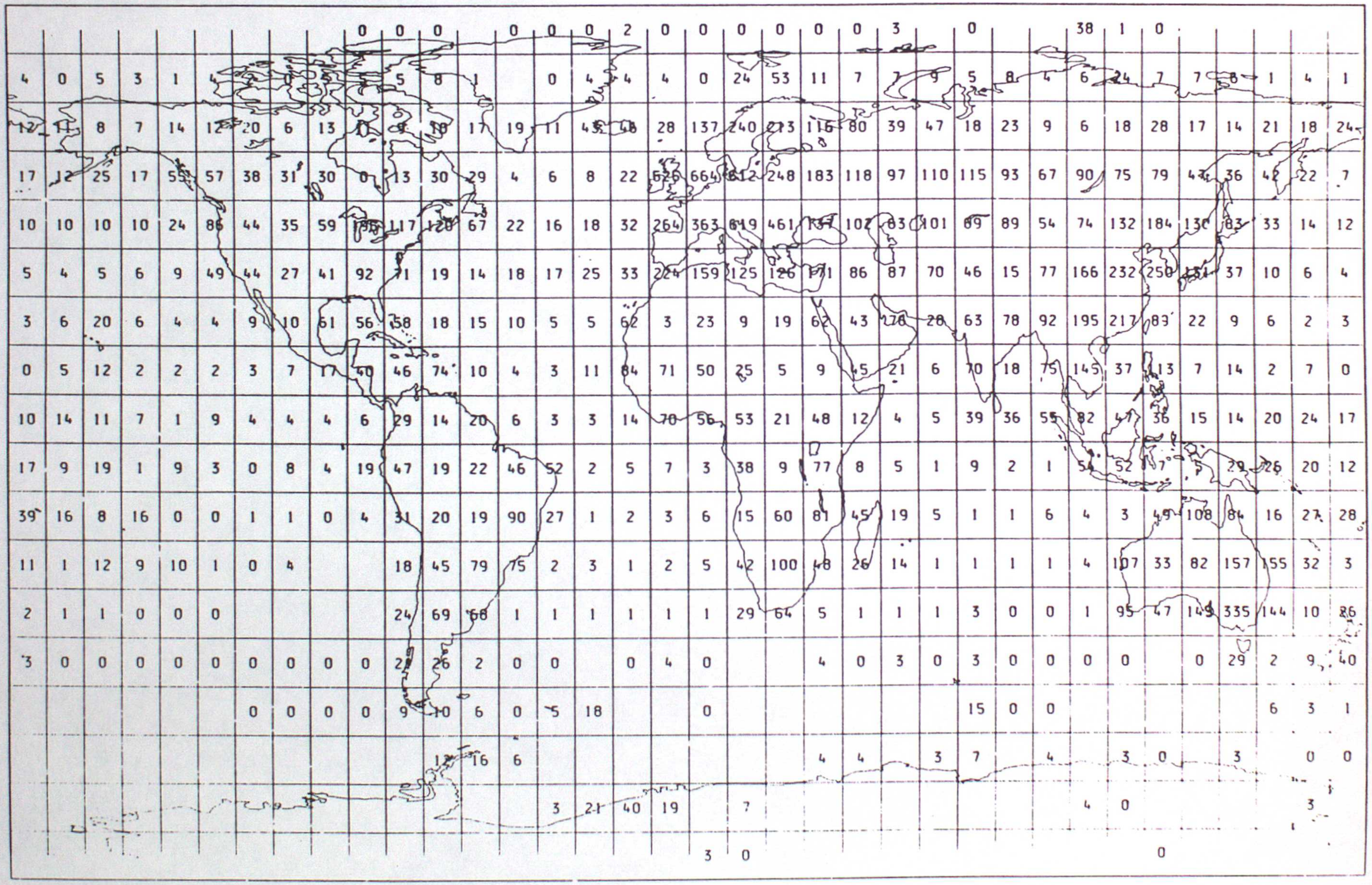
AVAILABILITY - SHIP/SYNOP - SEPTEMBER 1993

FIGURE 1

MAIN HOURS ONLY

10 DEGREE BOX AVERAGE NUMBER OF OBSERVATIONS IN 24 HOURS

TOTAL AVERAGE NUMBER OF OBSERVATIONS IN 24 HOURS = 18905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12 16 6 4 4 3 7 4 3 0 3 0 0
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3 0 0

TABLE 2

MONITORING OF MARINE SURFACE OBSERVATIONS
MONTHLY SUSPECT LIST - DRIFTING BUOYS
MONITORING CENTRE: BRACKNELL
MONTH: September, 93

Monitoring procedures

Period :One calendar month.

Data monitored :Reports from each unique identifier for drifting buoys.

Standard of comparison :Background field from Bracknell global model.

Position :Average Latitude and Longitude for period.

Observation times :00, 06, 12, 18 UTC

Elements monitored :Mean sea level pressure (hPa)
:Wind speed (m s^{-1}),
:Wind direction (degrees).

Parameters monitored :NOBS :Number of observations received excluding duplicates.

:NGE :Number of observations with gross errors.

:PGE :Percentage of observations with gross errors.

:SD :SD of difference of observations from background values excluding those with gross errors.

:BIAS :Mean difference of observations from background values excluding those with gross errors.
N.B. a positive bias indicates the observation is veered to the background.

:RMS :Root Mean Square difference of observations from background values excluding those with gross errors.

GROSS ERROR LIMIT :15 hPa (pressure)
:25 m s^{-1} (vector wind)

SELECTION CRITERIA :NOBS ≥ 20 ,and one or more of the following:

1. |bias| ≥ 4 hPa (pressure).
≥ 5 m s^{-1} (wind speed).
≥ 30 degrees (direction).

2. SD ≥ 6 hPa (pressure).
≥ 80 degrees (direction).

3. PGE ≥ 25.

IDENTIFIER	LAT.	LONG.	HOUR	ELEM	LEVEL	NOBS	NGE	PGE	SD	BIAS	RMS

MEAN SEA-LEVEL PRESSURE

IDENTIFIER	LAT.	LONG.	HOUR	ELEM	LEVEL	NOBS	NGE	PGE	SD	BIAS	RMS
25551	84.1	44.3	ALL	MSLP	SUR	34	8	24	6.3	1.0	6.4
25557	77.5	2.4	ALL	MSLP	SUR	34	5	15	6.8	-1.6	7.0
33021	-59.4	-27.3	ALL	MSLP	SUR	541	13	2	3.1	-5.2	6.0
48566	74.9	-142.0	ALL	MSLP	SUR	75	28	37	3.1	-7.7	8.3
52530	11.5	150.5	ALL	MSLP	SUR	57	0	0	1.4	-4.3	4.5
64902	63.6	-6.3	ALL	MSLP	SUR	26	23	88	6.0	7.1	9.3
71003	-79.0	-28.0	ALL	MSLP	SUR	507	507	100	0.0	0.0	0.0
74002	-72.1	-2.5	ALL	MSLP	SUR	441	226	51	2.8	-11.0	11.3

WIND SPEED

IDENTIFIER	LAT.	LONG.	HOUR	ELEM	LEVEL	NOBS	NGE	PGE	SD	BIAS	RMS
44777	52.1	-37.0	ALL	SPEED	SUR	184	0	0	4.3	-11.7	12.5
44778	55.8	-41.1	ALL	SPEED	SUR	218	0	0	3.6	-10.6	11.2
44779	53.2	-39.7	ALL	SPEED	SUR	207	0	0	4.1	-12.0	12.6
56513	-18.0	85.8	ALL	SPEED	SUR	235	0	0	1.6	-6.0	6.2

WIND DIRECTION

IDENTIFIER	LAT.	LONG.	HOUR	ELEM	LEVEL	NOBS	NGE	PGE	SD	BIAS	RMS
32316	2.0	-110.1	ALL	DIRN.	SUR	65	0	0	37.5	-37.4	53.0
43001	8.2	-111.0	ALL	DIRN.	SUR	54	0	0	105.3	-12.6	106.1
44513	57.7	-39.1	ALL	DIRN.	SUR	311	3	1	123.3	-89.8	152.5
44777	52.1	-37.0	ALL	DIRN.	SUR	180	0	0	83.3	74.5	111.8
44778	55.8	-41.1	ALL	DIRN.	SUR	205	0	0	88.5	55.1	104.2
44779	53.2	-39.7	ALL	DIRN.	SUR	201	0	0	102.4	53.3	115.4
51303	4.9	-169.9	ALL	DIRN.	SUR	24	0	0	53.5	-30.2	61.4
51309	8.1	-170.7	ALL	DIRN.	SUR	30	0	0	69.1	-33.5	76.8
52004	-4.2	165.9	ALL	DIRN.	SUR	43	0	0	109.2	-26.2	112.3
55589	-19.5	156.1	ALL	DIRN.	SUR	159	0	0	17.5	-63.0	65.4

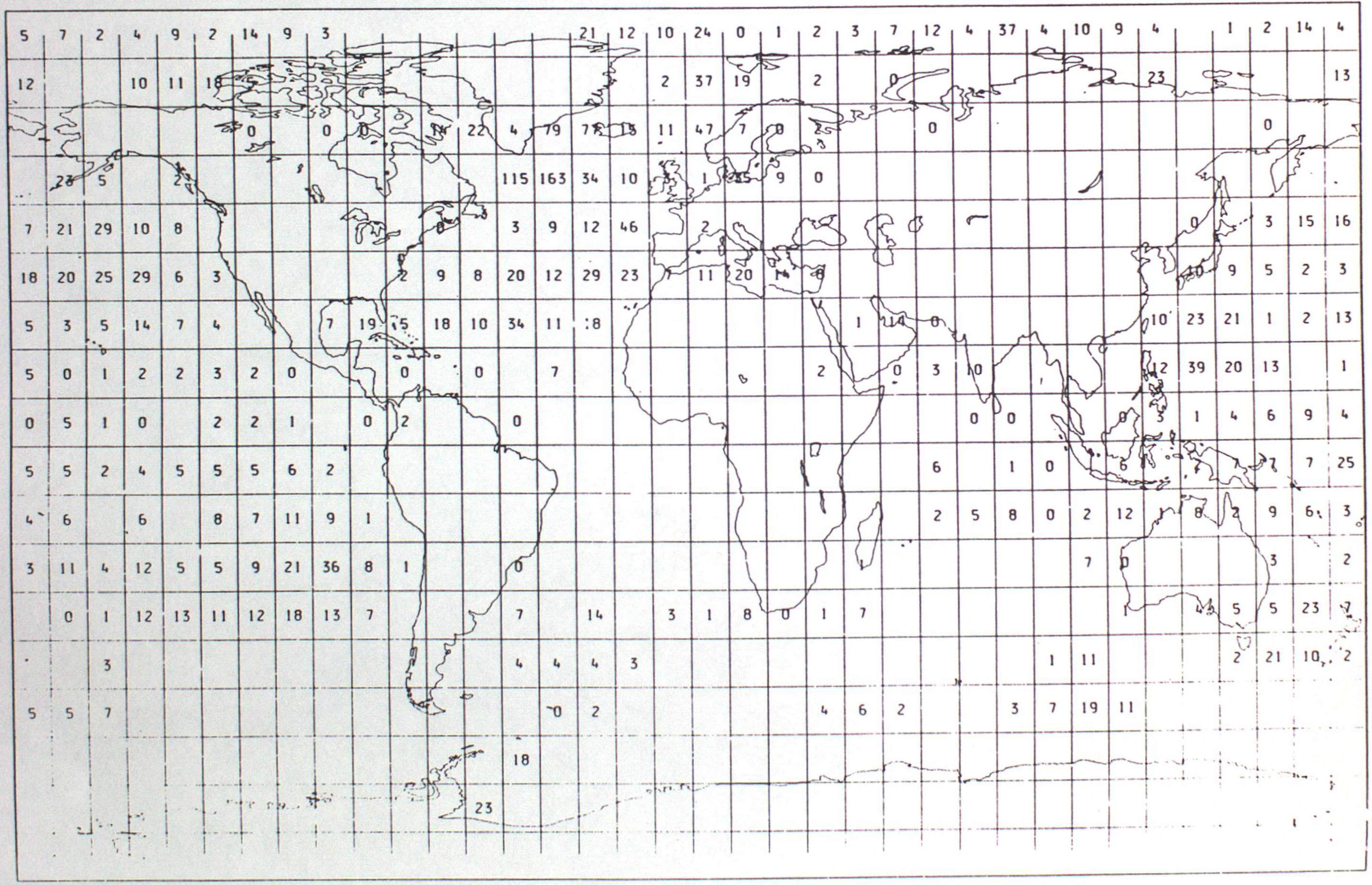
AVAILABILITY - DRIBU - SEPTEMBER 1993

MAIN HOURS ONLY

10 DEGREE BOX AVERAGE NUMBER OF OBSERVATIONS IN 24 HOURS

TOTAL AVERAGE NUMBER OF OBSERVATIONS IN 24 HOURS = 2635

FIGURE 2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5 3 5 14 7 4 7 19 15 18 10 34 11 18 1 14 0 10 23 21 1 2 13
5 0 1 2 2 3 2 0 0 0 7 2 0 3 10 12 39 20 13 1
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4 6 6 8 7 11 9 1 2 5 8 0 2 12 1 8 2 9 6 3
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0 1 12 13 11 12 18 13 7 7 14 3 1 8 0 1 7 1 4 5 5 5 23 7
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5 5 7 0 2 4 6 2 3 7 19 11
18
23

TABLE 3

MONTHLY MONITORING OF AIRCRAFT OBSERVATIONS
MONITORING CENTRE: BRACKNELL
MONTH:SEPTEMBER 93

Monitoring procedures:
Period :One calendar month.
Data monitored :Statistics for each airline carrier.
Area monitored :90°N - 90°S, 180°W - 180°E.
Standard of comparison :Background field from Bracknell global model.

Observation times :All hours combined.

Level(s) monitored :70.0 - 500.0 hPa

Elements monitored :TEMP in °C ; WIND in m s^{-1}

Parameters monitored :N REP.:Number of observations received excluding duplicates.
:PG :Percentage of observations with gross errors.
:PR :Percentage of observations rejected by quality control including rejections from the duplicate check.
:PC :Percentage of observations with calm winds.
:RMS :Root Mean Square difference of observations from background values excluding those with gross errors in Temperature & vector wind.
:BIAS :Mean difference of observations from background values excluding those with gross errors in Temperature & Wind Speed.

GROSS ERROR LIMITS :10.0 °C ; 60 m s^{-1} Vector Wind

SELECTION CRITERIA :N REP ≥ 20

	TEMPERATURE					WIND					
IDENT.	N.REP.	PG	PR	RMS	BIAS	N.REP.	PG	PR	PC	RMS	BIAS
AAA	32	0	0	2.0	0.4	33	0	0	0	8.2	2.4
AAL	3266	0	6	1.7	0.2	3297	0	6	0	8.0	2.0
AAN	183	1	1	1.9	-0.3	170	0	2	0	9.7	0.9
AAR	1269	1	7	2.0	-0.2	1260	0	6	0	8.2	1.5
ACA	645	1	3	2.3	-0.2	665	0	3	1	7.7	1.4
ACI	70	3	3	1.9	1.0	69	0	1	0	7.8	1.3
ACU	60	0	2	1.9	-0.5	57	0	4	0	7.9	0.8
AEA	222	1	4	1.8	-0.3	216	0	3	0	8.3	0.8
AEL	309	1	4	1.8	0.2	313	0	4	0	9.0	1.4
AFL	151	3	19	3.6	2.0	157	1	17	2	14.7	1.3
AFR	915	1	4	1.9	0.4	928	0	5	1	8.2	1.7
AJJ	111	0	2	2.6	0.9	111	0	5	0	12.0	0.3
AMM	24	0	4	2.2	0.0	25	0	4	0	7.4	2.4
AMT	213	0	12	1.5	0.4	226	0	12	0	6.8	1.6
AMX	433	1	2	1.8	0.2	436	0	2	0	9.1	1.2
ANA	820	0	6	2.0	0.2	816	0	7	0	8.7	2.2
ANO	31	0	71	1.2	0.4	31	0	71	0	6.8	-0.5
ANZ	3545	0	3	1.8	0.1	3539	0	4	1	7.8	1.7
AOM	554	1	3	1.6	0.6	558	0	4	0	8.7	1.5
ARG	81	0	5	2.4	0.2	80	0	4	0	10.6	3.2
ARP	330	1	6	1.6	0.3	320	0	9	5	6.9	1.5
AUA	41	0	2	2.0	-0.9	42	0	5	0	8.5	0.0
AVA	366	1	1	1.8	0.1	367	0	3	1	9.4	2.0
AVN	40	0	8	1.7	0.9	40	3	10	0	6.9	1.4
AZA	435	1	4	1.9	0.3	446	0	3	0	9.0	2.0
BAL	167	1	19	1.4	-0.4	178	0	19	0	8.4	2.0
BAW	1002	1	3	2.0	0.0	1017	0	4	1	8.4	1.8
BWA	433	1	2	2.0	1.4	440	0	4	1	9.1	1.8
CAL	1967	1	7	1.8	-0.3	1961	0	8	1	8.5	1.7
CCA	320	1	8	2.3	0.3	323	0	10	0	11.0	2.2
CDN	2006	1	6	2.1	0.2	2001	0	7	1	8.3	1.8
CES	208	0	4	1.6	0.3	210	0	5	0	9.1	2.4
CFC	31	0	19	1.9	-0.6	31	0	23	0	8.0	0.9
CFG	524	2	2	1.9	-1.0	526	0	2	0	8.9	1.5
CKS	67	0	18	1.5	0.7	67	0	18	0	6.6	2.2
CKT	39	0	8	1.9	0.4	41	0	7	0	9.9	3.1
CLX	48	0	2	2.2	0.5	50	0	4	0	10.4	2.7
CMI	1437	3	9	2.2	0.5	1428	0	11	3	8.0	1.9
CMM	237	0	7	1.8	0.1	244	0	9	0	8.6	2.3
CNB	68	1	9	2.8	1.0	73	0	7	0	10.2	2.4
COA	2067	1	8	1.7	0.5	2045	0	10	2	7.5	1.2
CPA	367	0	1	1.8	0.3	356	0	2	1	7.9	1.5
CRL	198	1	2	1.8	-0.1	202	0	3	1	8.8	1.1
CSA	20	0	0	2.2	0.7	20	0	5	0	10.2	3.1
CSN	44	2	5	2.1	0.3	41	0	5	5	6.8	1.1
CTM	119	0	27	1.7	-0.3	119	0	29	1	7.9	2.4
CUB	237	0	14	2.2	0.8	236	0	17	0	9.8	1.9
DAL	5054	0	8	2.1	0.5	4874	0	8	0	8.4	2.0
DHL	131	2	3	2.6	1.2	137	0	4	0	11.0	1.7
DLH	2054	0	4	2.0	-0.3	2061	0	9	4	8.3	1.9
DOA	104	1	5	1.6	-0.1	106	0	7	0	9.6	2.1
EIA	134	3	14	3.4	0.4	142	0	11	1	13.9	3.1
ELY	104	0	7	1.7	-0.2	112	0	9	0	8.0	2.5
EVA	688	0	8	2.0	-0.8	696	0	9	0	9.3	1.9
FDX	1070	1	4	2.0	0.5	1076	0	5	1	8.8	1.6
FIN	427	0	3	2.0	0.3	426	0	3	0	9.3	2.3
FJI	388	1	2	1.7	0.7	391	0	3	0	9.4	1.7
FMN	35	3	3	1.2	0.3	35	0	0	0	9.3	3.0
GAF	86	0	0	2.5	0.0	88	0	0	0	8.2	2.6

	TEMPERATURE					WIND					
IDENT.	N.REP.	PG	PR	RMS	BIAS	N.REP.	PG	PR	PC	RMS	BIAS
GIA	370	0	3	1.7	0.6	356	0	4	1	7.1	2.3
HAL	1407	0	12	1.9	0.5	1396	0	13	1	9.1	2.0
HLF	127	0	0	1.7	-0.6	127	0	2	0	8.4	2.2
IBE	2568	1	16	1.6	0.2	2550	0	17	0	8.3	0.9
ICE	367	0	2	2.0	-0.3	366	0	2	0	9.9	2.1
ICX	42	0	0	2.3	-0.3	41	0	0	0	5.6	0.9
JAA	57	2	5	2.2	0.7	57	0	4	0	9.3	3.4
JAL	5177	1	6	1.6	0.3	5154	0	7	1	8.3	1.6
JAS	103	0	3	1.0	0.4	99	0	3	0	8.3	0.4
JAZ	71	0	10	1.3	0.7	70	0	10	0	5.9	1.5
KAL	3514	1	6	2.0	-0.1	3497	0	7	0	8.8	2.0
KLM	1678	0	1	2.0	0.3	1686	0	2	1	8.6	1.9
LAN	24	0	8	3.1	-0.2	24	0	4	0	10.6	1.9
LDA	191	1	13	2.0	-1.1	193	0	14	0	9.1	1.8
LDI	36	0	0	2.5	-1.6	37	0	3	0	7.7	2.2
LIB	68	1	1	1.4	-0.6	69	0	3	0	8.9	1.8
LOT	566	1	3	2.2	-0.3	567	0	2	0	9.0	1.6
LTU	523	0	3	1.7	0.4	497	0	5	1	8.1	2.2
MAH	93	0	6	2.3	-0.3	97	0	5	0	10.6	1.6
MAS	453	0	5	1.7	0.4	446	0	5	0	8.3	1.7
MDA	137	1	6	2.6	1.2	137	0	4	0	8.6	3.2
MPH	495	0	1	1.7	0.0	496	0	2	1	8.2	2.0
MTQ	36	0	19	2.1	1.1	39	0	26	3	9.0	1.9
NAL	70	1	3	2.0	0.3	70	0	1	0	8.1	0.2
NCA	769	0	5	1.9	-0.1	766	0	6	1	8.1	1.2
NWA	11198	1	5	2.0	0.2	11186	0	6	1	8.6	1.8
PAL	962	1	8	2.1	-0.3	948	0	12	3	7.9	1.5
PAO	474	1	5	1.6	0.6	475	0	7	2	8.2	1.4
QFA	2633	1	5	1.9	0.4	2615	0	5	1	7.4	1.5
RAF	82	1	2	2.3	0.0	82	0	2	0	10.1	3.3
RBA	23	0	0	1.7	0.4	23	0	4	0	9.7	4.1
RKA	86	0	2	1.5	0.6	87	0	2	0	7.9	1.8
RON	92	3	8	2.1	1.4	92	0	8	1	9.5	1.4
ROY	26	4	8	2.1	-0.3	25	0	8	0	8.2	1.8
RRR	199	3	11	2.3	-0.2	203	0	12	0	8.3	1.4
SAA	173	1	3	2.0	-0.8	173	0	4	0	8.5	1.3
SAS	2048	0	1	2.1	-0.2	2046	0	2	1	8.0	1.7
SAW	21	0	5	2.1	-0.2	21	0	5	0	9.9	1.8
SIA	1509	1	7	1.8	-0.3	1502	0	8	1	8.7	1.8
SJM	29	3	10	1.9	0.3	31	0	3	0	7.2	0.8
SMB	25	0	4	2.2	0.5	25	0	4	0	10.3	-0.1
SOL	72	3	10	1.9	0.9	72	0	11	4	6.4	1.5
SPP	278	0	2	2.0	0.4	262	0	4	0	9.4	1.5
SSR	30	0	0	1.2	0.8	29	0	0	0	7.0	1.7
SVA	81	5	2	1.7	-0.2	90	1	2	0	10.7	1.0
SWR	61	0	5	1.8	0.2	61	0	0	0	7.8	2.0
TAP	798	1	2	1.7	-0.2	798	0	3	0	9.4	1.3
TEJ	57	0	21	1.8	-0.5	58	0	19	0	10.1	1.7
THA	576	1	8	1.9	0.6	574	0	9	1	9.5	1.8
TOW	49	0	6	2.4	0.8	51	0	2	0	8.6	1.3
TSC	21	0	14	3.4	0.2	22	0	27	0	9.0	1.9
TWA	1076	0	4	2.0	0.5	1068	0	5	0	8.8	1.4
UAL	35884	2	48	1.5	-0.1	35913	0	48	0	7.3	0.9
ULE	313	0	1	2.0	0.0	310	0	1	0	7.9	2.6
UPS	699	2	16	2.2	-0.6	719	0	17	0	9.8	1.1
USA	28	0	11	1.2	-0.1	28	0	11	0	6.5	1.6
VHL	21	0	10	1.5	1.3	21	0	10	0	6.6	1.6
VIA	807	1	10	1.5	0.4	809	0	11	1	8.5	1.6
VIR	67	0	4	2.1	-0.4	68	0	4	0	10.0	2.8

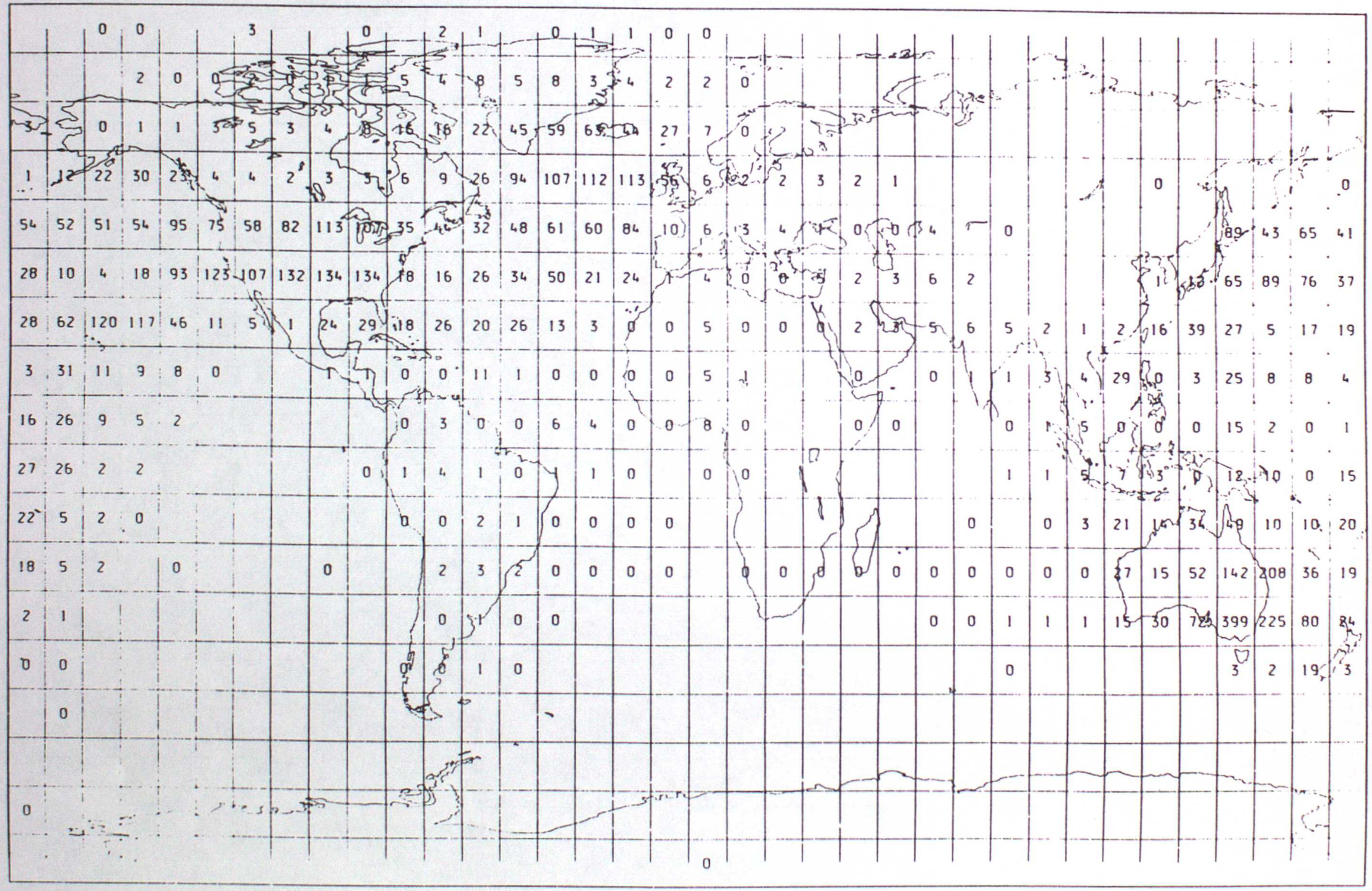
	TEMPERATURE					WIND					
IDENT.	N.REP.	PG	PR	RMS	BIAS	N.REP.	PG	PR	PC	RMS	BIAS
VRG	297	1	4	2.2	0.4	296	0	3	0	9.2	1.8
VSP	148	3	5	2.0	0.3	148	0	6	0	8.5	1.9
WOA	52	0	8	1.7	0.6	53	0	9	0	7.8	2.2
AL	441	1	1	1.3	0.5	416	0	1	0	6.4	0.6
AN	25090	0	41	1.6	0.4	24907	0	41	0	7.1	2.1
BA	9716	0	85	2.1	1.1	9709	0	85	0	7.4	1.7
CO	4395	0	87	1.6	0.9	4358	0	87	0	6.1	1.2
DL	1541	3	52	1.6	0.6	1540	0	62	22	12.1	-3.3
KL	3612	0	95	2.3	1.8	3610	0	73	0	7.1	1.8
QF	9054	0	36	1.6	0.5	9054	0	36	0	6.3	1.2
RE	46	0	7	4.0	3.3	42	0	5	0	11.8	2.8
SR	27	4	22	3.1	0.8	26	0	23	0	15.4	4.9
UA	1557	2	65	1.6	-0.4	1425	0	66	0	9.2	1.7
WA	433	18	100	1.9	0.3	395	2	100	49	15.5	-9.0
XX	1256	1	100	1.6	0.6	1256	0	100	1	10.6	1.6
M	247	6	14	3.1	1.4	248	0	12	0	10.0	2.5
N	411	3	8	2.7	0.5	432	0	7	0	10.0	1.5

MEAN DAILY COUNT OF AIRCRAFT 70 - 500 HPA

SEPTEMBER 1993

OBSERVATIONS WITH RMSVW DIFFERENCE > 60 MPS EXCLUDED

FIGURE 3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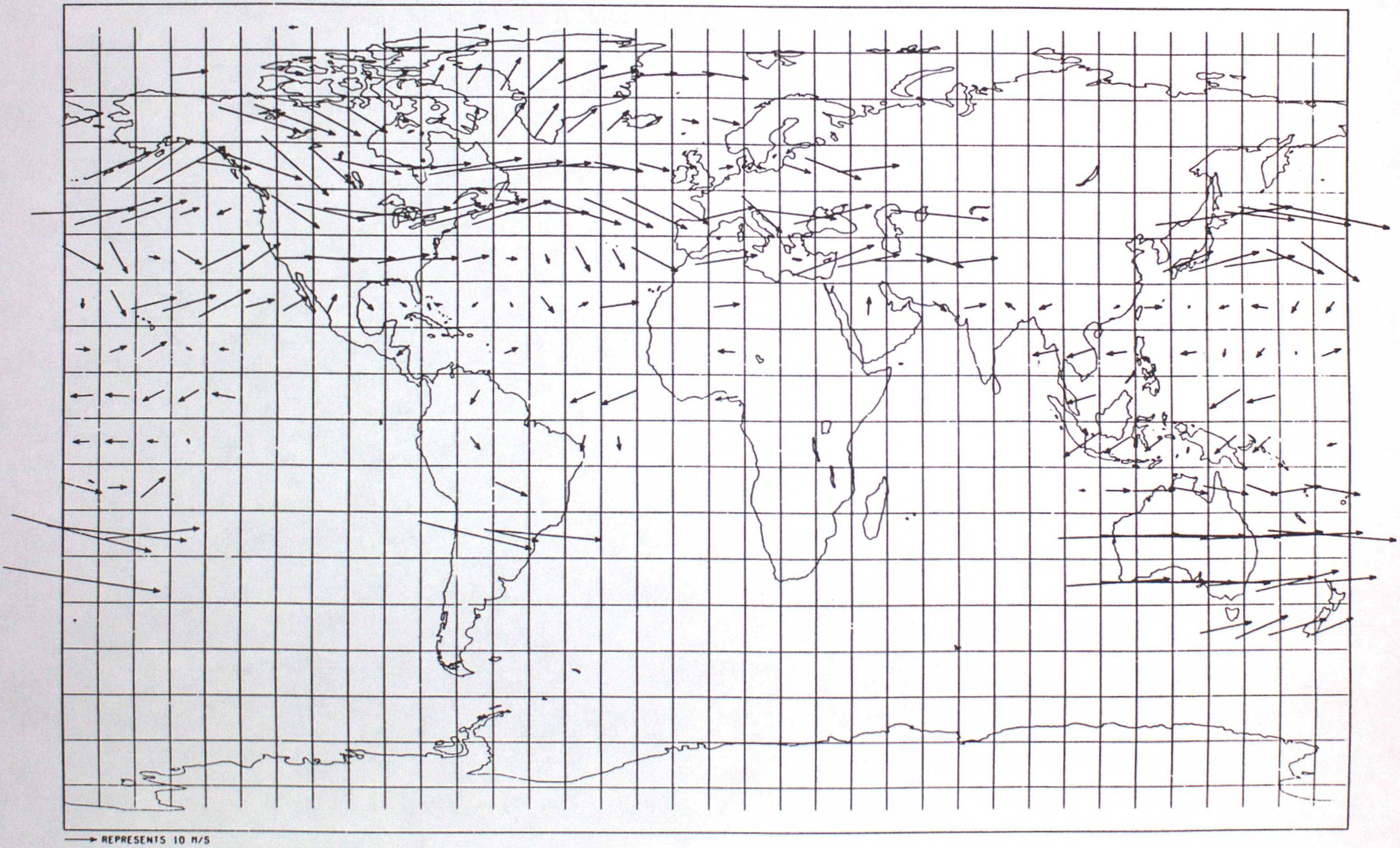
28 10 4 18 93 123 107 132 134 134 18 16 26 34 50 21 24 1 4 0 0 5 2 3 6 2 11 33 65 89 76 37
28 62 120 117 46 11 5 1 24 29 18 26 20 26 13 3 0 0 5 0 0 0 2 3 5 6 5 2 1 2 16 39 27 5 17 19
3 31 11 9 8 0 1 1 0 0 11 1 0 0 0 0 5 1 0 0 1 1 3 4 29 0 3 25 8 8 4
16 26 9 5 2 0 3 0 0 6 4 0 0 8 0 0 0 0 1 5 0 0 0 15 2 0 1
27 26 2 2 0 1 4 1 0 1 1 0 0 0 1 1 5 7 3 0 12 10 0 15
22 5 2 0 0 0 2 1 0 0 0 0 0 0 3 21 14 34 49 10 10 20
18 5 2 0 0 2 3 2 0 0 0 0 0 0 0 0 0 0 0 0 0 27 15 52 142 208 36 19
2 1 0 1 0 0 0 0 1 1 1 15 30 72 399 225 80 84
0 0 0 0 1 0 0 3 2 19 3
0
0
0

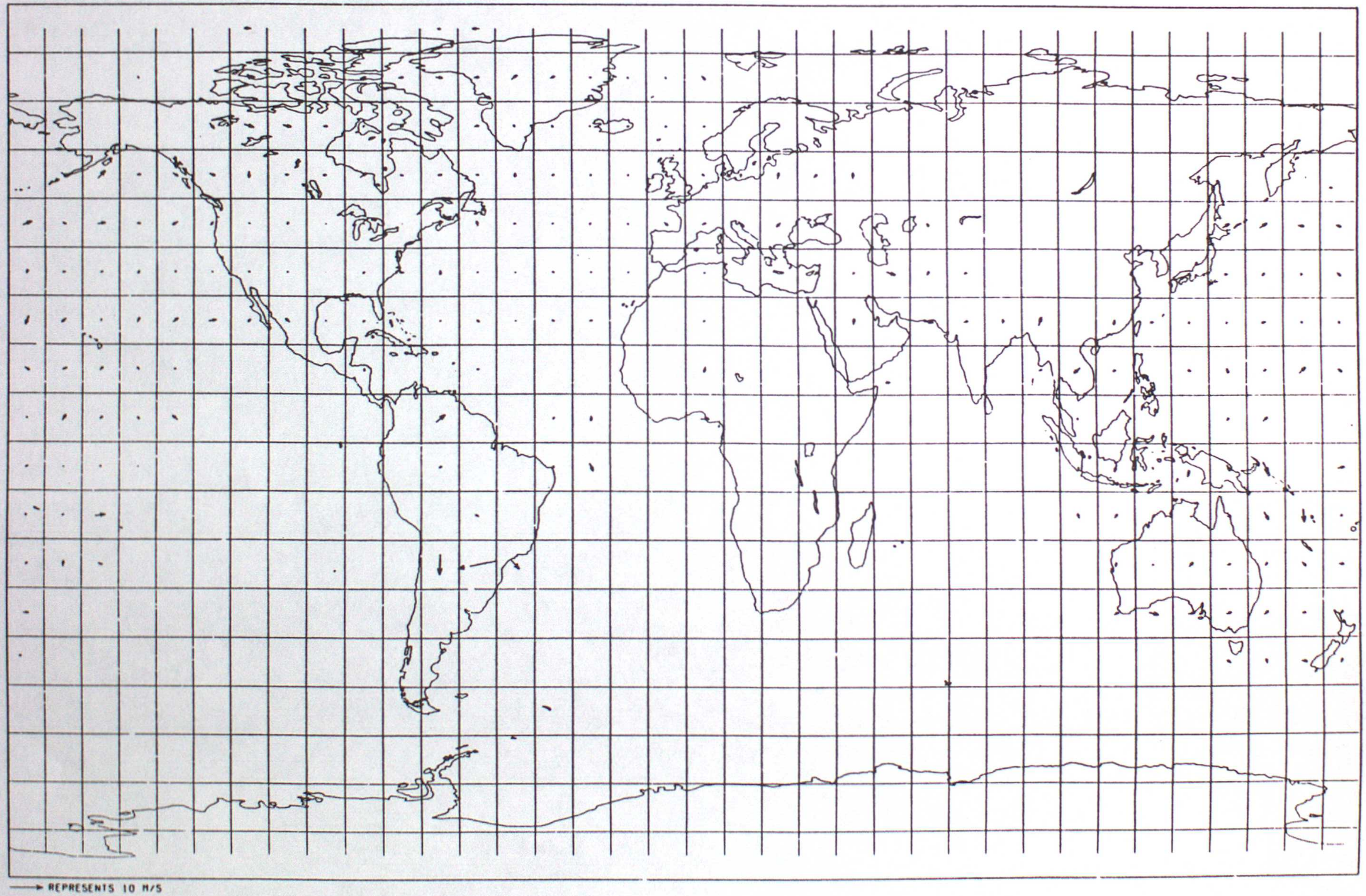
AIRCRAFT MEAN WINDS BETWEEN 70 AND 500 HPA
SEPTEMBER 1993
OBSERVATIONS WITH RMSVW DIFFERENCE > 60 MPS EXCLUDED
VALUES ARE PRINTED WHERE > 30 OBS ARE PRESENT

FIGURE 4

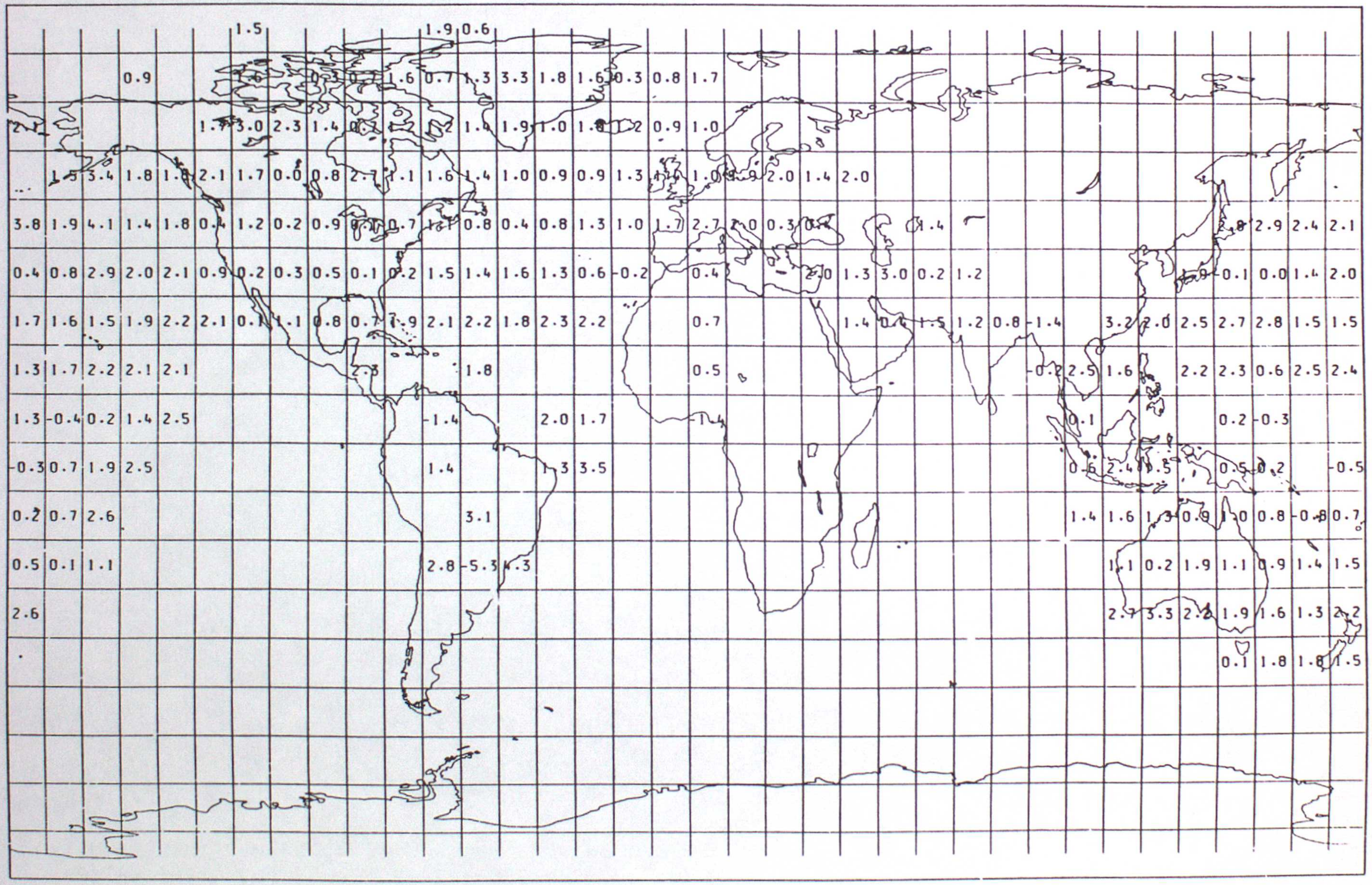


AIRCRAFT MEAN O-B WINDS BETWEEN 70 AND 500 HPA
SEPTEMBER 1993
OBSERVATIONS WITH RMSVW DIFFERENCE > 60 MPS EXCLUDED
VALUES ARE PRINTED WHERE > 30 OBS ARE PRESENT

FIGURE 5



AIRCRAFT : MEAN O-B SPEEDS (M/S) BETWEEN 70 AND 500 HPA FIGURE 6
SEPTEMBER 1993
OBSERVATIONS WITH RMSVW DIFFERENCE > 60 MPS EXCLUDED
VALUES ARE PRINTED WHERE > 30 OBS ARE PRESENT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1.3
3.3
1.8
1.6
0.3
0.8
1.7
2.1
1.7
3.0
2.3
1.4
0.7
1.2
1.2
1.4
1.9
1.0
1.8
1.2
0.9
1.0
1.5
3.4
1.8
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2.1
1.7
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1.6
1.4
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0.9
1.3
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0.9
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1.4
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3.8
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1.8
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0.2
0.9
0.7
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0.4
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0.8
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0.3
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1.7
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1.9
2.2
2.1
0.1
1.1
0.8
0.7
1.9
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2.2
1.8
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2.2
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1.2
0.8
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2.5
-1.4
2.0
1.7
-1.4
0.1
0.2
-0.3
-0.3
0.7
1.9
2.5
1.4
1.3
3.5
0.6
2.4
1.5
0.5
0.2
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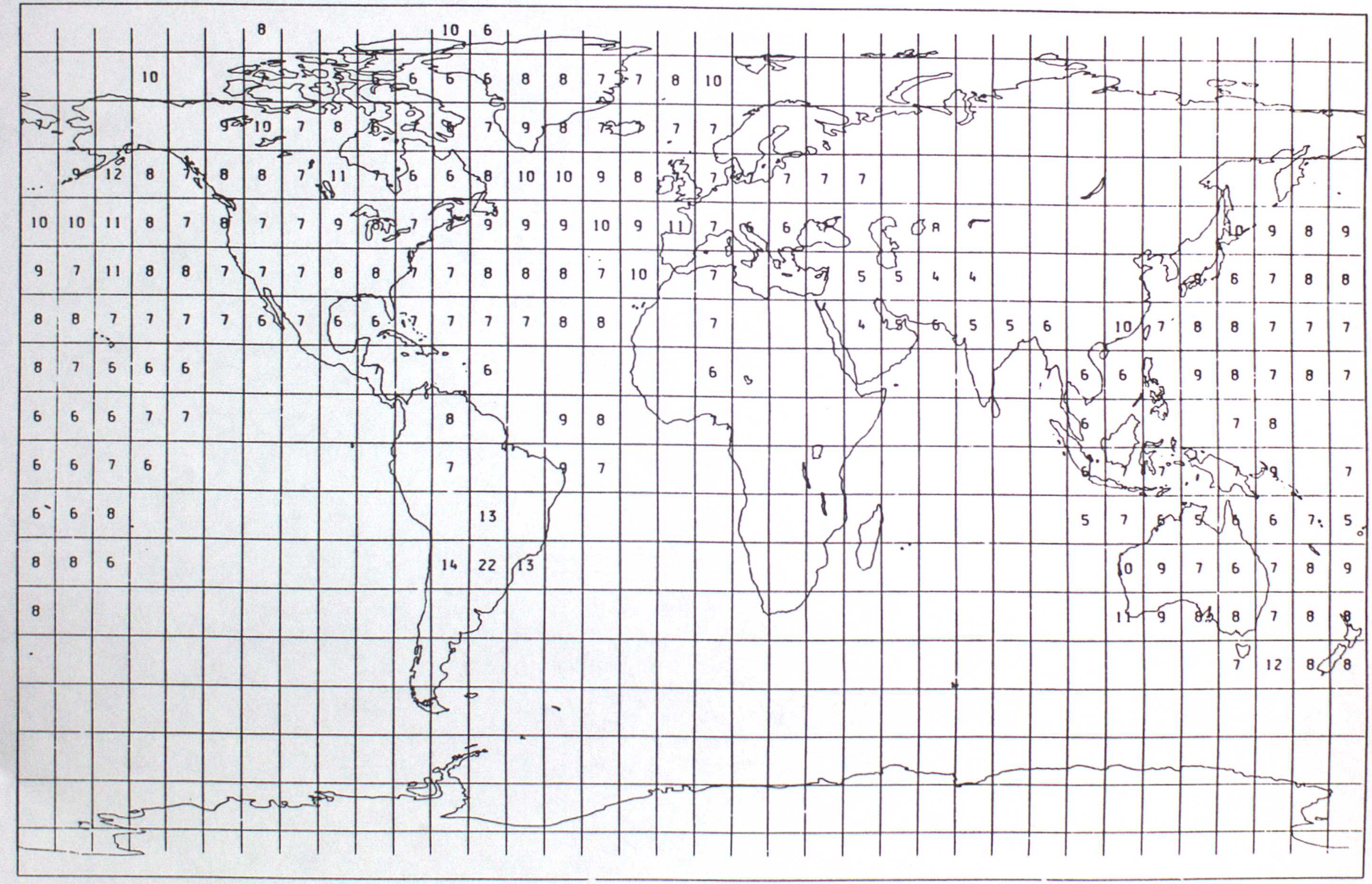
0.2
0.7
2.6
3.1
1.4
1.6
1.3
0.9
1.0
0.8
-0.8
0.7
0.5
0.1
1.1
2.8
-5.3
4.3
1.1
0.2
1.9
1.1
0.9
1.4
1.5
2.6
2.7
3.3
2.2
1.9
1.6
1.3
2.2
0.1
1.8
1.8
1.5

AIRCRAFT : RMS O-B VECTOR (M/S) BETWEEN 70 AND 500 HPA FIGURE 7
SEPTEMBER 1993
OBSERVATIONS WITH RMSVW DIFFERENCE > 60 MPS EXCLUDED
VALUES ARE PRINTED WHERE > 30 OBS ARE PRESENT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9 10 7 8 6 7 8 7 9 8 7 7 7
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9 7 11 8 8 7 7 7 8 8 7 7 8 8 8 7 10 7 5 5 4 4 8 6 7 8 8
8 8 7 7 7 7 6 7 6 6 7 7 7 7 8 8 7 4 5 6 5 5 6 10 7 8 8 7 7 7
8 7 5 6 6 6 6 6 6 9 8 7 8 7
6 6 6 7 7 8 9 8 6 7 8
6 6 7 6 7 9 7 6 7 7 9 7
6 6 8 13 5 7 6 5 6 6 7 5
8 8 6 14 22 13 10 9 7 6 7 8 9
8 11 9 8 8 7 8 8
7 12 8 8

TABLE 4

MONTHLY MONITORING OF RADIOSONDE OBSERVATIONS
MONITORING CENTRE: BRACKNELL
MONTH:SEPTEMBER 1993

Monitoring procedures:
Period :One calendar month.
Data monitored :Reports from each unique identifier for radiosonde TEMPs.
Area monitored :90°N - 90°S, 180°W - 180°E.
Standard of comparison :Background field from Bracknell global model.

Observation times :00 UTC and 12 UTC.

Level(s) monitored :Standard levels between 1000.0 - 30.0 hPa

Element monitored :GEOPOTENTIAL HEIGHT IN metres

Parameters monitored

:NUM OBS	:Number of observations available at level shown during period.
:NUM GROSS	:Number of gross errors at level shown during period.
:% REJ	:Percentage of observations rejected by quality control at level shown during period.
:SD	:SD of difference of observations from background values at level shown excluding those with gross errors.
:BIAS	:Mean difference of observations from background values at level shown excluding those with gross errors.
:RMS	:Root Mean Square difference of observations from background values at level shown excluding those with gross errors.
:NUM LEVELS	:Number of levels satisfying selection criteria.

GROSS ERROR LIMITS :Defined in Appendix I.1

SELECTION CRITERIA :≥ 3 levels with ≥ 10 observations and ≥ 100 m weighted RMS.

ONLY THE WORST LEVEL IS SHOWN WITH UNWEIGHTED RMS

WMO IDENT	OBS TIME	ELM	LEV	LAT/LONG	NUM OBS	NUM GROSS	SD	BIAS	RMS	NUM LEVELS
17220	12	Z	70	38/ 27	25	0	47.8	133.6	141.9	5
20667	12	Z	100	73/ 70	12	0	35.7	120.0	125.2	4
26258	00	Z	100	58/ 28	12	0	81.9	73.1	109.8	4
31707	00	Z	150	48/ 131	24	0	60.7	83.2	103.0	4
40179	12	Z	50	32/ 35	19	0	39.6	178.3	182.6	6
41594	00	Z	500	32/ 73	17	0	28.6	-62.8	69.0	8
42027	00	Z	200	34/ 75	16	1	116.9	59.5	131.1	6
42182	00	Z	70	29/ 77	17	0	174.2	18.0	175.1	5
42182	12	Z	70	29/ 77	13	2	146.8	156.6	214.7	7
42314	00	Z	150	27/ 95	12	2	90.1	105.7	138.8	7
42314	12	Z	200	27/ 95	11	1	77.3	123.1	145.3	9
42339	00	Z	200	26/ 73	23	1	118.1	-20.5	119.8	7
42339	12	Z	150	26/ 73	20	1	122.9	83.6	148.6	7
42361	00	Z	150	26/ 78	13	0	140.3	-10.2	140.7	7
42369	00	Z	70	27/ 81	9	1	155.1	166.4	227.5	8
42369	12	Z	200	27/ 81	15	0	93.6	29.8	98.2	5
42379	00	Z	50	27/ 83	10	1	139.5	169.6	219.6	10
42379	12	Z	70	27/ 83	8	2	196.1	83.3	213.0	8
42397	00	Z	250	27/ 88	11	0	100.6	16.2	101.9	5
42410	00	Z	30	26/ 92	12	4	133.4	233.0	268.5	8
42492	00	Z	200	26/ 85	11	0	117.5	-52.8	128.8	5
42724	00	Z	200	24/ 91	13	0	92.7	48.5	104.7	6
42724	12	Z	250	24/ 91	10	0	77.9	74.6	107.9	4
42779	00	Z	70	23/ 82	10	3	168.7	117.5	205.6	7
42809	00	Z	50	23/ 88	13	1	187.3	84.8	205.6	8
42867	00	Z	100	21/ 79	12	1	147.9	81.2	168.7	5
42867	12	Z	70	21/ 79	8	2	92.1	240.0	257.1	6
42971	00	Z	70	20/ 86	14	3	190.2	112.4	220.9	8
42971	12	Z	70	20/ 86	14	0	118.5	176.1	212.2	8
43003	12	Z	70	19/ 73	9	3	163.2	114.0	199.1	7
43014	00	Z	200	20/ 75	21	0	122.5	79.2	145.9	6
43014	12	Z	200	20/ 75	9	1	87.9	150.9	174.6	5
43041	00	Z	100	19/ 82	8	5	101.6	163.9	192.8	7
43041	12	Z	150	19/ 82	15	0	111.0	72.4	132.5	5
43128	00	Z	150	17/ 78	22	0	127.3	-19.2	128.7	6
43128	12	Z	50	17/ 78	9	2	122.3	166.2	206.4	7
43150	00	Z	250	18/ 83	23	0	73.0	-36.6	81.6	4
43150	12	Z	250	18/ 83	21	0	65.2	-57.8	87.1	4
43185	00	Z	100	16/ 81	8	1	166.3	38.8	170.8	5
43185	12	Z	150	16/ 81	10	0	111.2	87.4	141.5	6
43192	00	Z	50	15/ 74	9	2	230.9	-32.3	233.2	5
43192	12	Z	200	15/ 74	14	2	107.2	74.9	130.8	6
43279	00	Z	70	13/ 80	12	1	189.6	9.4	189.9	7
43279	12	Z	50	13/ 80	12	0	207.8	155.3	259.5	7
43285	00	Z	70	13/ 75	10	1	146.9	10.9	147.3	4
43285	12	Z	50	13/ 75	7	5	101.5	222.3	244.4	9
43295	00	Z	30	13/ 78	8	2	78.2	243.4	255.6	8
43295	12	Z	200	13/ 78	24	0	66.1	75.5	100.4	5
43311	12	Z	200	11/ 73	12	0	78.6	71.4	106.2	6
43333	00	Z	200	12/ 93	21	0	88.5	33.4	94.6	6
43333	12	Z	150	12/ 93	14	0	112.5	37.0	118.4	5
43346	00	Z	50	11/ 80	15	1	154.2	54.7	163.6	5
43346	12	Z	50	11/ 80	14	0	137.3	188.9	233.5	10
43369	00	Z	70	8/ 73	8	2	140.5	-17.0	141.5	7
43369	12	Z	100	8/ 73	11	1	185.5	83.6	203.5	7
43371	00	Z	150	8/ 77	25	2	119.8	2.0	119.8	8
43371	12	Z	50	8/ 77	14	1	214.5	78.6	228.5	8
50774	00	Z	70	48/ 129	26	1	24.7	127.2	129.5	7
50953	00	Z	70	46/ 127	29	0	37.3	125.8	131.2	6
50953	12	Z	100	46/ 127	27	0	31.9	108.5	113.1	4
52267	00	Z	1000	42/ 101	29	0	8.7	31.0	32.2	4
52267	12	Z	70	42/ 101	27	0	32.1	136.6	140.3	5
54135	12	Z	100	44/ 122	27	0	45.7	110.1	119.2	6

WMO IDENT	OBS TIME	ELM	LEV	LAT/LONG	NUM OBS	NUM GROSS	SD	BIAS	RMS	NUM LEVELS
54161	00	Z	70	44/ 125	28	0	44.4	129.2	136.6	6
54161	12	Z	150	44/ 125	24	0	44.7	102.3	111.7	8
54292	00	Z	30	43/ 129	26	0	55.3	161.4	170.6	4
54337	12	Z	70	41/ 121	24	0	111.9	89.6	143.4	4
54342	00	Z	100	42/ 123	28	0	36.7	110.3	116.2	4
54374	00	Z	70	42/ 127	26	0	37.5	131.1	136.3	5
54497	00	Z	70	40/ 124	29	0	100.9	103.9	144.8	5
54662	00	Z	100	39/ 122	30	0	34.4	118.7	123.6	4
54823	00	Z	100	37/ 117	30	0	51.5	106.9	118.7	4
54823	12	Z	100	37/ 117	24	0	48.6	102.9	113.8	4
56080	00	Z	1000	35/ 103	20	9	12.0	74.8	75.8	5
56080	12	Z	1000	35/ 103	26	1	24.9	40.0	47.1	7
56294	12	Z	70	31/ 104	24	0	48.3	129.7	138.5	5
56778	12	Z	1000	25/ 103	26	1	21.3	57.2	61.1	4
56985	00	Z	100	23/ 103	28	0	33.2	141.7	145.6	5
56985	12	Z	100	23/ 103	28	0	39.7	135.5	141.2	4
57516	00	Z	100	30/ 106	20	0	47.4	131.5	139.8	6
57957	00	Z	100	25/ 110	27	0	43.4	131.8	138.8	5
58238	00	Z	100	32/ 119	29	0	37.5	133.4	138.6	5
58424	00	Z	100	31/ 117	30	0	32.2	132.8	136.6	4
58424	12	Z	100	31/ 117	27	0	29.1	123.1	126.5	4
58665	00	Z	100	29/ 121	29	0	47.4	135.9	143.9	5
58847	00	Z	100	26/ 119	30	0	44.5	115.1	123.4	4
60630	12	Z	250	27/ 2	27	0	31.8	92.5	97.8	11
62306	00	Z	70	31/ 27	15	0	65.4	170.5	182.6	4
62306	12	Z	50	31/ 27	3	10	124.7	308.3	332.6	9
62378	12	Z	100	30/ 31	5	9	23.7	261.4	262.5	6
67774	00	Z	30	-18/ 31	10	0	45.2	203.3	208.3	4
89664	00	Z	400	-78/ 167	14	0	65.7	19.2	68.4	7
91557	12	Z	700	-18/ 168	25	1	17.0	-75.7	77.6	8

AVAILABILITY - TEMP - 500 HPA GEOPOTENTIAL - SEP 1993 FIGURE 8
ALL HOURS
10 DEGREE BOX AVERAGE NUMBER OF OBSERVATIONS IN 24 HOURS
TOTAL AVERAGE NUMBER OF OBSERVATIONS IN 24 HOURS - 1229

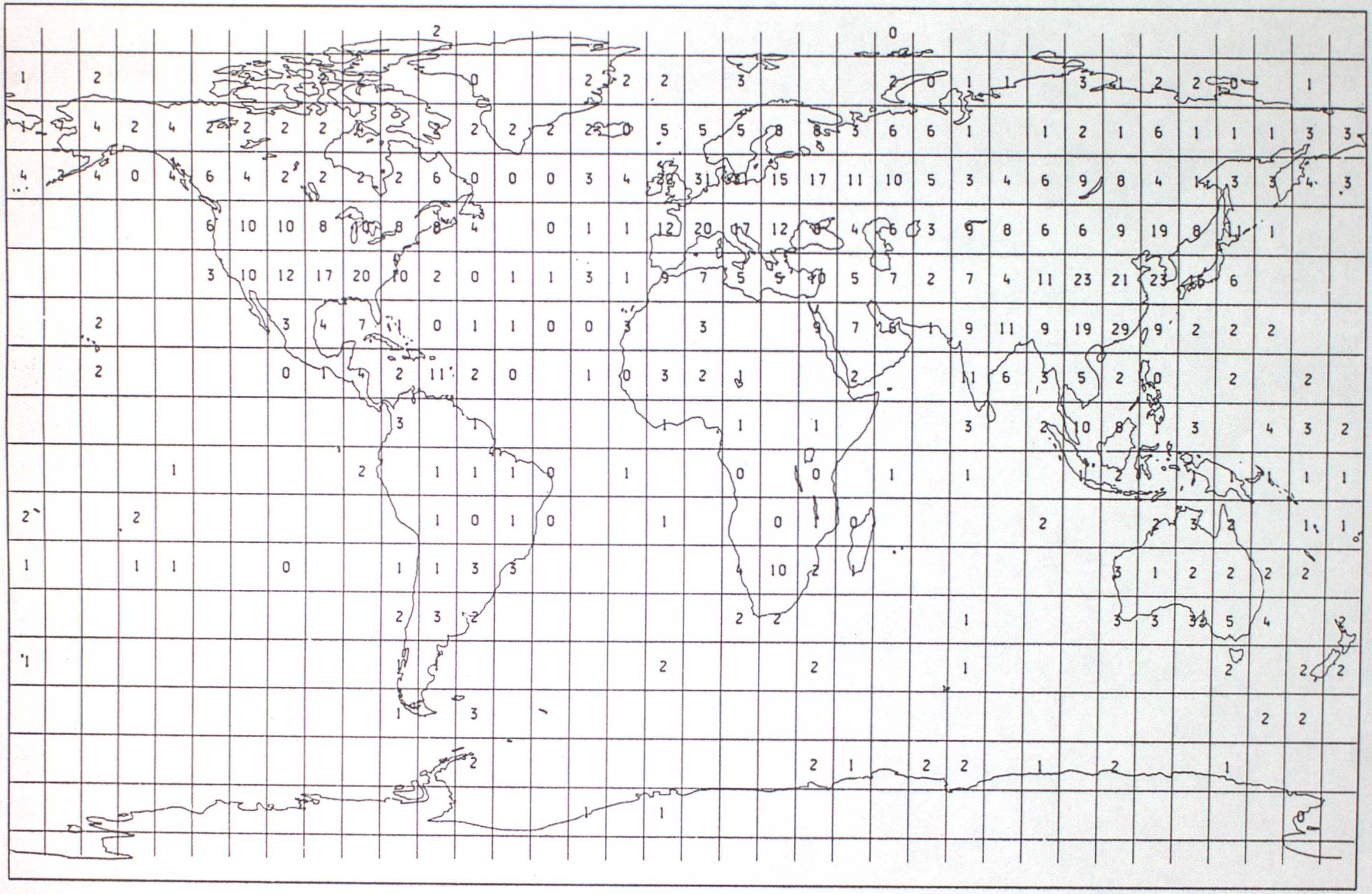

2 0
1 2 0 2 2 2 3 2 0 1 1 3 1 2 2 0 1
4 2 4 2 2 2 2 2 2 2 2 2 0 5 5 5 8 8 3 6 6 1 1 2 1 6 1 1 1 3 3
4 2 4 0 4 6 4 2 2 2 2 6 0 0 0 3 4 2 31 31 15 17 11 10 5 3 4 6 9 8 4 1 3 3 4 3
6 10 10 8 10 8 8 4 0 1 1 12 20 17 12 8 4 6 3 9 8 6 6 9 19 8 1 1
3 10 12 17 20 10 2 0 1 1 3 1 9 7 5 5 10 5 7 2 7 4 11 23 21 23 5 6
2 3 4 7 1 0 1 1 0 0 3 3 9 7 6 1 9 11 9 19 29 9 2 2 2
2 0 1 4 2 11 2 0 1 0 3 2 1 2 1 6 3 5 2 0 2 2
3 1 1 1 1 3 2 10 8 1 3 4 3 2
1 2 1 1 1 0 1 0 0 1 1 1 2 1 1 1
2 2 1 0 1 0 1 0 1 0 2 2 3 2 1 1
1 1 1 0 1 1 3 3 4 10 2 1 3 1 2 2 2 2
2 3 2 2 2 1 3 3 3 5 4 2
1 2 2 1 2 2 2
1 3 2 2
2 2 1 2 2 1 2 1
1

TABLE 5

MONTHLY MONITORING OF RADIOSONDE OBSERVATIONS
MONITORING CENTRE: BRACKNELL
MONTH:SEPTEMBER 1993

Monitoring procedures:

Period :One calendar month.

Data monitored :Reports from each unique identifier for radiosonde TEMPs.

Area monitored :90°N - 90°S, 180°W - 180°E.

Standard of comparison :Background field from Bracknell global model.

Observation times :00 UTC and 12 UTC.

Level(s) monitored :Standard levels between 1000.0 - 100.0 hPa

Element monitored :VECTOR WIND in m s^{-1}

Parameters monitored

:NUM OBS :Number of observations available at level shown during period.

:NUM GROSS :Number of gross errors at level shown during period.

:% REJ :Percentage of observations rejected by quality control at level shown during period.

:UBIAS,VBIAS :Mean difference of observations of U and V components from background values at level shown excluding those with gross errors.

:RMS :Root Mean Square difference of observations from background values at level shown excluding those with gross errors.

:NUM LEVELS :Number of levels satisfying selection criteria.

GROSS ERROR LIMITS :Defined in Appendix I.2

SELECTION CRITERIA :≥ 10 observations and ≥ 15 m s^{-1} RMS vector wind.

ONLY THE STANDARD LEVEL BETWEEN 1000 - 100 hPa
WITH HIGHEST RMS IS SHOWN

WMO IDENT	OBS TIME	ELM	LEV	LAT/LONG	NUM OBS	NUM GROSS	% REJ	UBIAS	VBIAS	RMS	LEVELS
15480	00	V	250	44/ 29	10	0	20	-11.8	-1.0	18.3	2
68240	12	V	250	-24/ 26	14	0	21	0.2	-1.3	19.9	1

AVAILABILITY - TEMP - 300 HPA WIND - SEP 1993

FIGURE 9

ALL HOURS

10 DEGREE BOX AVERAGE NUMBER OF OBSERVATIONS IN 24 HOURS

TOTAL AVERAGE NUMBER OF OBSERVATIONS IN 24 HOURS - 1107

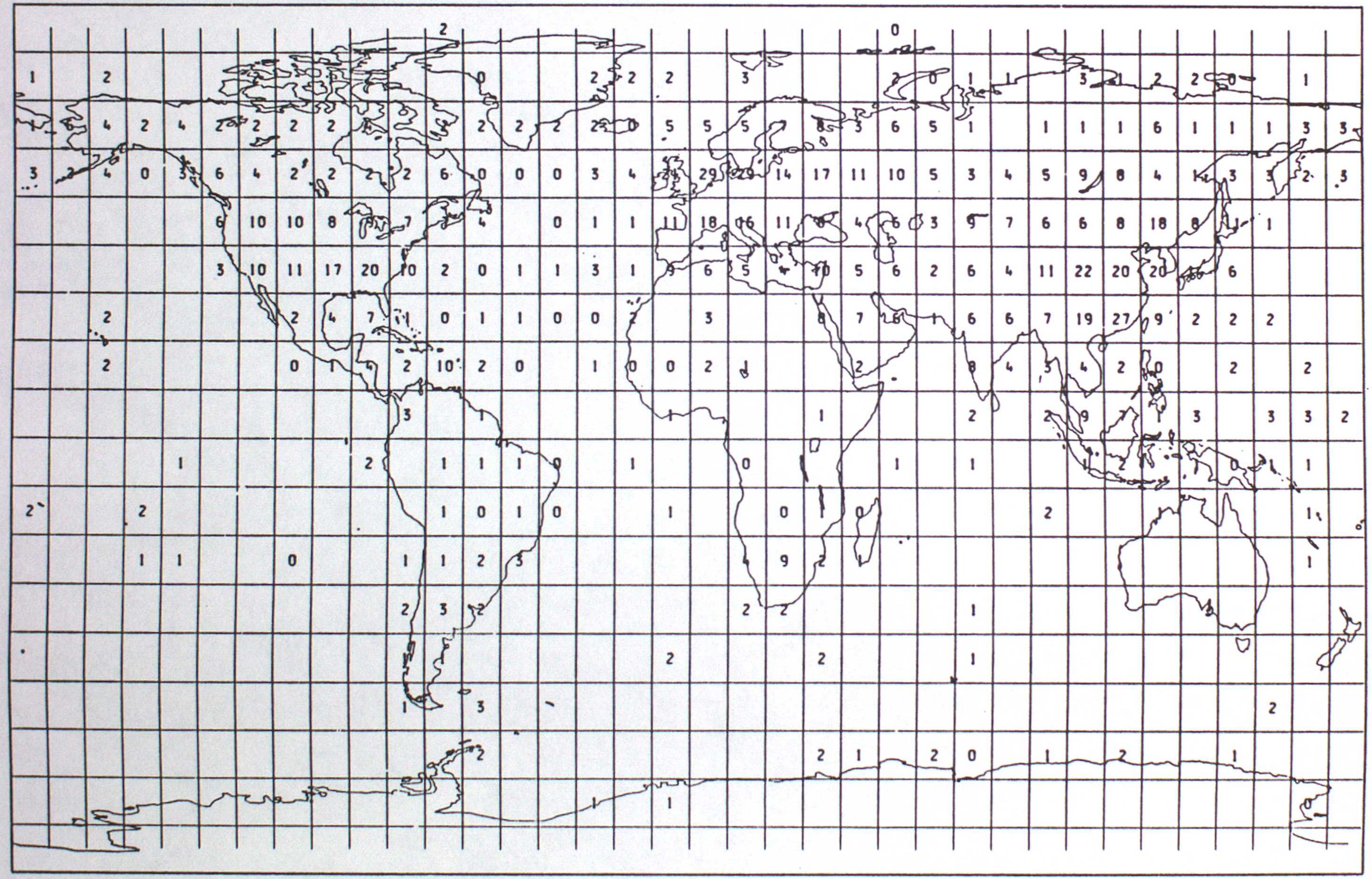

2 0
1 2 0 2 2 2 3 2 0 1 1 3 1 2 2 0 1
6 4 2 4 2 2 2 2 2 2 2 2 2 0 5 5 5 7 8 3 6 5 1 1 1 1 6 1 1 1 3 3
3 2 4 0 3 6 4 2 2 2 2 6 0 0 0 3 4 24 29 29 14 17 11 10 5 3 4 5 9 8 4 1 3 3 2 3
6 10 10 8 7 4 0 1 1 11 18 16 11 8 4 6 3 9 7 6 6 8 18 8 1 1
3 10 11 17 20 10 2 0 1 1 3 1 9 6 5 4 10 5 6 2 6 4 11 22 20 20 6
2 2 4 7 1 0 1 1 0 0 2 3 8 7 6 1 6 6 7 19 27 9 2 2 2
2 0 1 4 2 10 2 0 1 0 0 2 1 2 8 4 3 4 2 0 2 2
3 1 1 1 2 2 9 7 1 3 3 3 2
1 2 1 1 1 0 1 0 1 1 1 2 0 1
2 2 1 0 1 0 1 0 1 0 2 1
1 1 0 1 1 2 3 4 9 2 1 1
2 3 2 2 2 1
1 1 2 2 1
1 3 2
2 2 1 2 0 1 2 1
1 1

TABLE 6

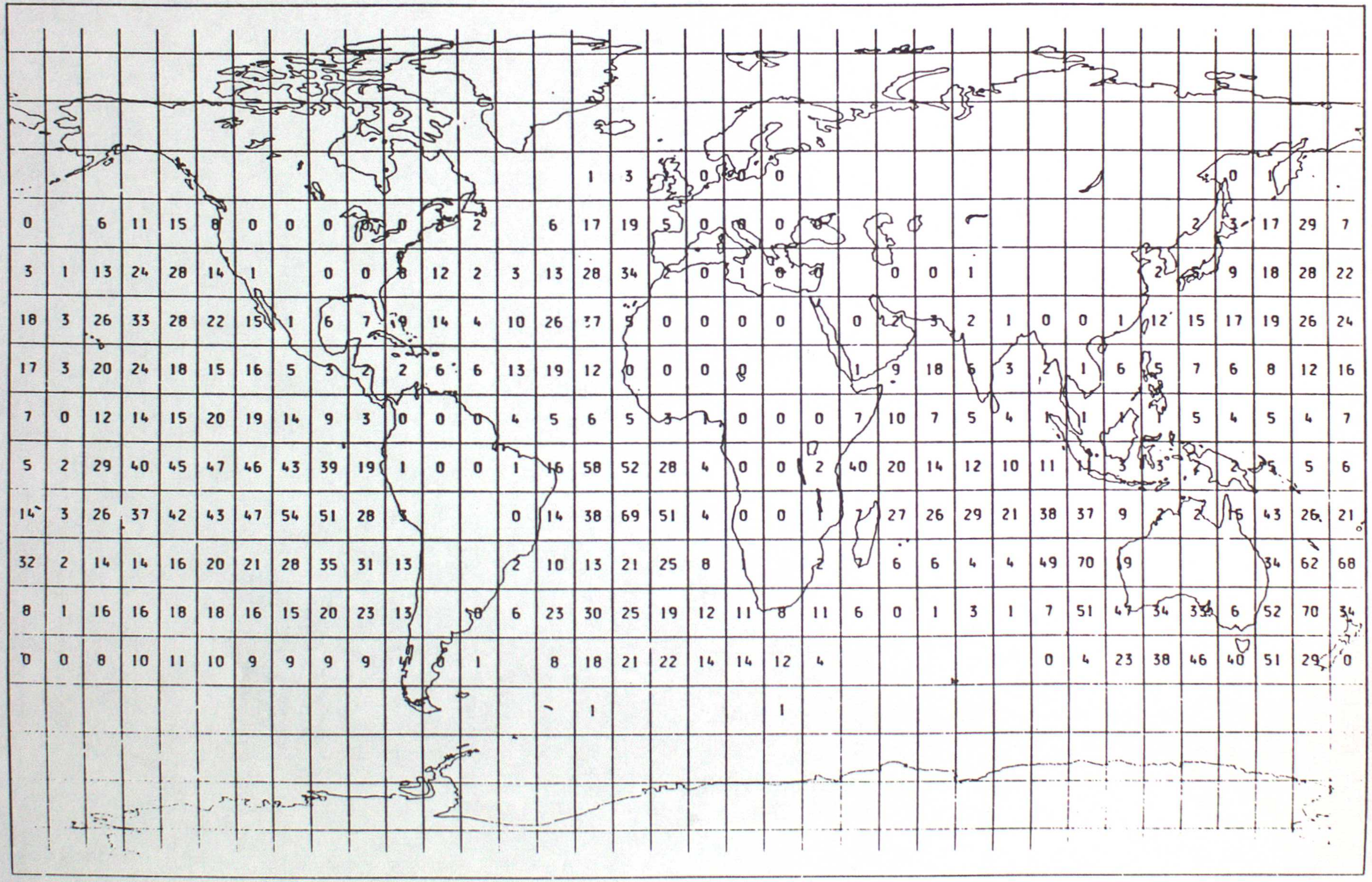
MONTHLY MONITORING OF RADIOSONDE OBSERVATIONS
MONITORING CENTRE: BRACKNELL
MONTH:SEPTEMBER 1993

Monitoring procedures:

Period	:One calendar month.	
Data monitored	:Reports from each unique identifier for radiosonde TEMPs.	
Area monitored	:90°N - 90°S, 180°W - 180°E.	
Standard of comparison	:Background field from Bracknell global model.	
Observation times	:00 UTC and 12 UTC.	
Level(s) monitored	:Standard levels between 500.0 - 150.0 hPa	
Element monitored	:WIND DIRECTION in degrees	
Parameters monitored	:NUM OBS	:Average number of observations at all levels.
	:BIAS	:Mean difference of observations from background values from all levels.
	:MAX SPREAD	:(For observation - background values) Maximum absolute difference of SD at any level from SD at all levels.
	:SD	:SD of difference of observations from background values at all levels.
SELECTION CRITERIA	:NUM OBS ≥ 5, and ABSOLUTE BIAS ≥ 10°, with SD < 30°, and MAX SPREAD < 10°	

WMO IDENT	OBS TIME	ELM	LAT/LONG	NUM OBS	BIAS	MAX SPREAD	SD
21965	00	DD	71/ 162	7	10.0	10.0	21.5
22845	00	DD	61/ 39	10	16.1	9.3	16.8
24641	00	DD	64/ 122	22	12.6	4.5	14.8
25399	12	DD	66/-170	17	11.4	5.6	14.6
28952	00	DD	53/ 64	25	-21.2	3.7	13.8
28952	12	DD	53/ 64	24	-23.0	1.8	9.8
35108	00	DD	51/ 51	25	-23.1	4.8	11.0
35108	12	DD	51/ 51	25	-24.3	3.9	10.6
43346	00	DD	11/ 80	17	-11.6	8.3	17.9
60571	00	DD	32/ -2	18	15.0	7.4	20.4
78384	12	DD	19/ -81	9	-11.9	9.3	29.3
96471	12	DD	6/ 116	15	12.4	9.3	21.4

AVERAGE DAILY NUMBER OF SATOB OBSERVATIONS BETWEEN 701 AND 1000 HPA FIGURE 10
SEPTEMBER 1993


1 3 0 0 0 0 1
0 6 11 15 8 0 0 0 0 0 0 2 6 17 19 5 0 0 0 0 2 3 17 29 7
3 1 13 24 28 14 1 0 0 8 12 2 3 13 28 34 2 0 1 0 0 0 0 1 2 5 9 18 28 22
18 3 26 33 28 22 15 1 6 7 19 14 4 10 26 37 5 0 0 0 0 0 2 3 2 1 0 0 1 12 15 17 19 26 24
17 3 20 24 18 15 16 5 3 2 2 6 6 13 19 12 0 0 0 0 1 9 18 6 3 2 1 6 5 7 6 8 12 16
7 0 12 14 15 20 19 14 9 3 0 0 0 4 5 6 5 3 1 0 0 0 7 10 7 5 4 1 1 1 1 5 4 5 4 7
5 2 29 40 45 47 46 43 39 19 1 0 0 1 16 58 52 28 4 0 0 2 40 20 14 12 10 11 1 3 3 2 5 5 6
14 3 26 37 42 43 47 54 51 28 3 0 14 38 69 51 4 0 0 1 7 27 26 29 21 38 37 9 2 2 15 43 26 21
32 2 14 14 16 20 21 28 35 31 13 2 10 13 21 25 8 1 2 7 6 6 4 4 49 70 9 34 62 68
8 1 16 16 18 18 16 15 20 23 13 8 6 23 30 25 19 12 11 8 11 6 0 1 3 1 7 51 47 34 33 6 52 70 34
0 0 8 10 11 10 9 9 9 9 4 0 1 8 18 21 22 14 14 12 4 0 4 23 38 46 40 51 29 0
1 1

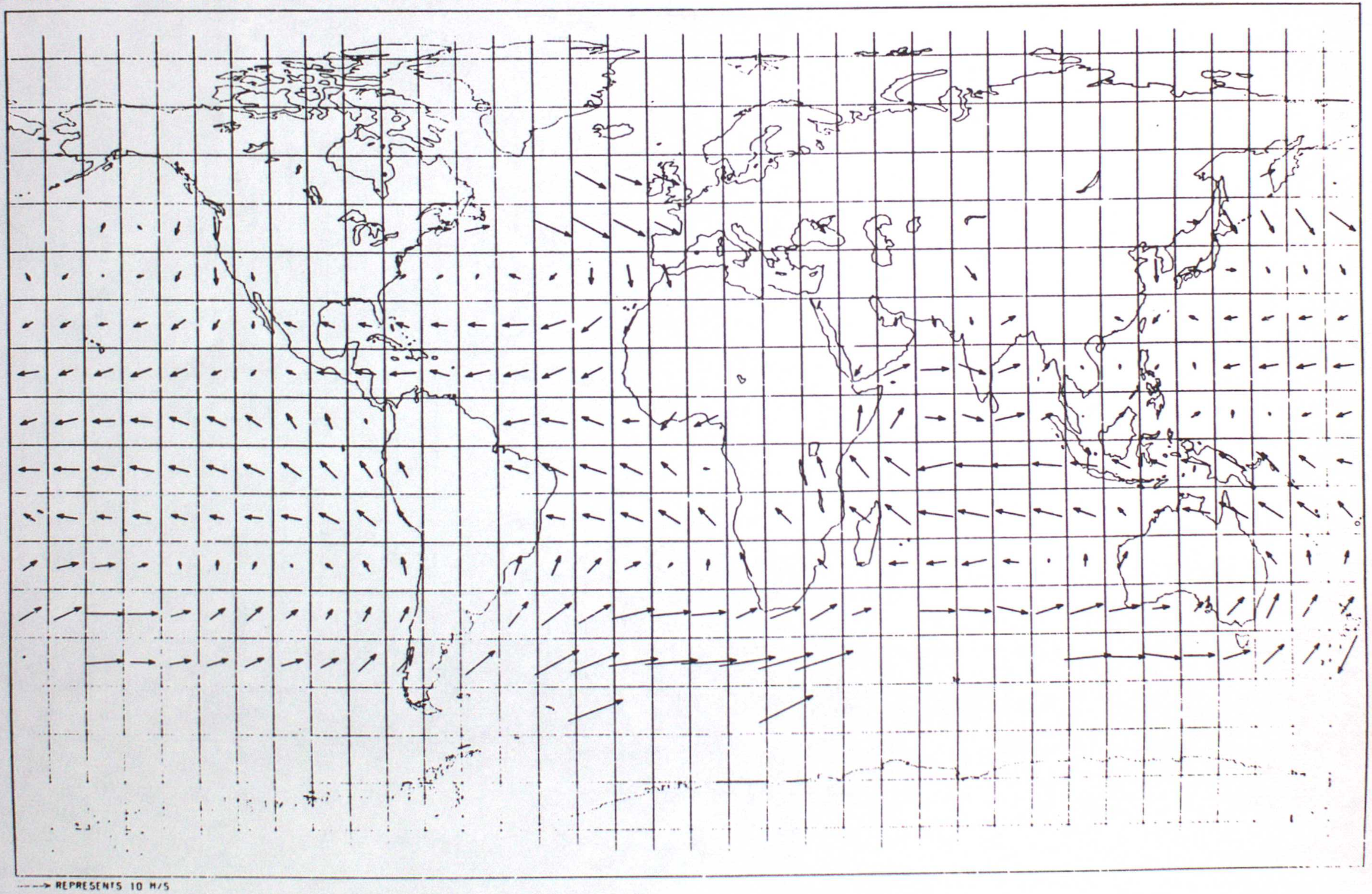
SATOB VECTOR MEAN WINDS BETWEEN 701-1000 HPA

SEPTEMBER 1993

ALL OBSERVATIONS

ARROWS PLOTTED WHERE > 10 OBS ARE PRESENT

FIGURE 11


REPRESENTS 10 M/S

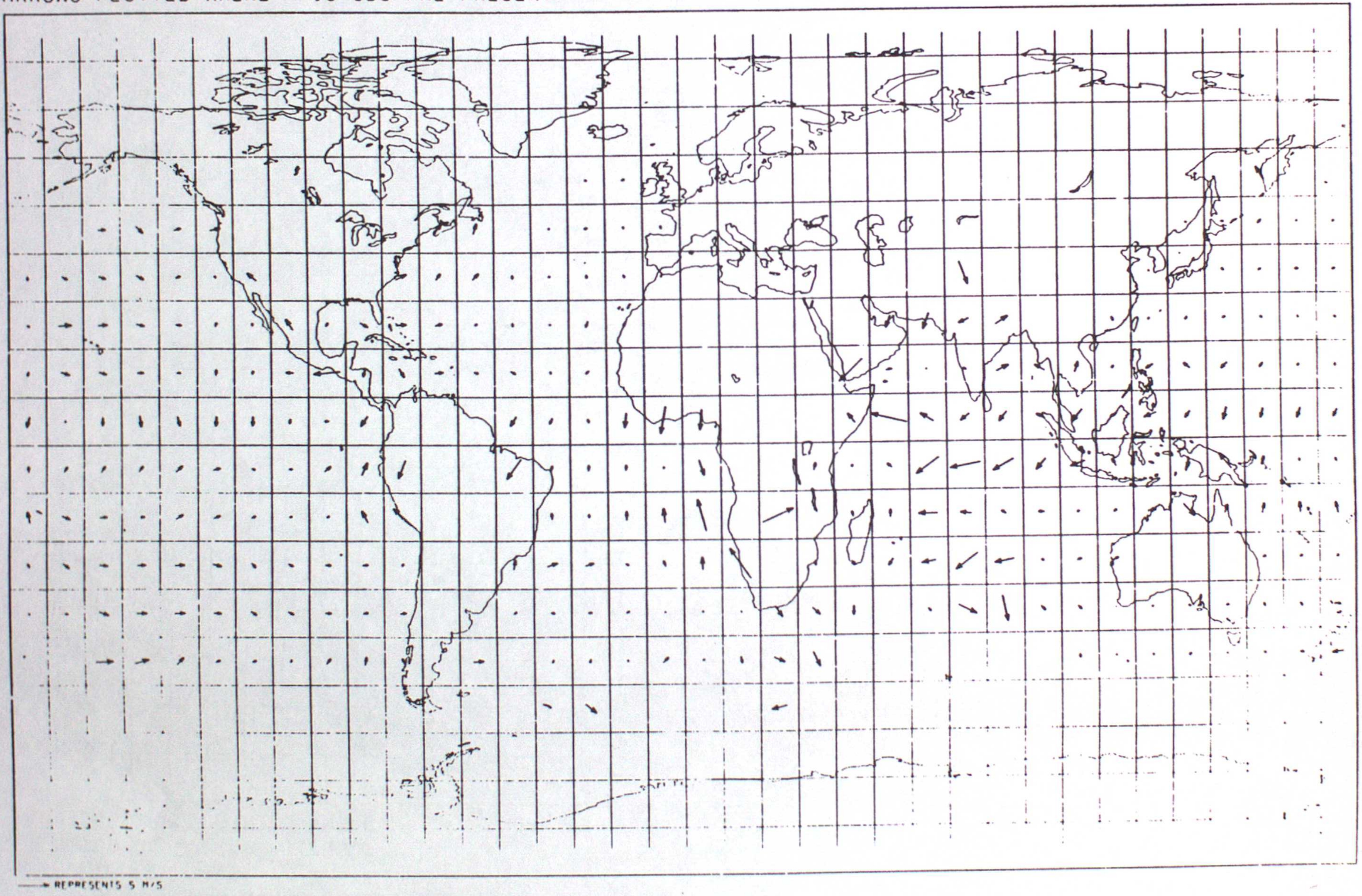
SATOB O-B VECTOR WIND DIFFERENCES BETWEEN 701-1000 HPA

FIGURE 12

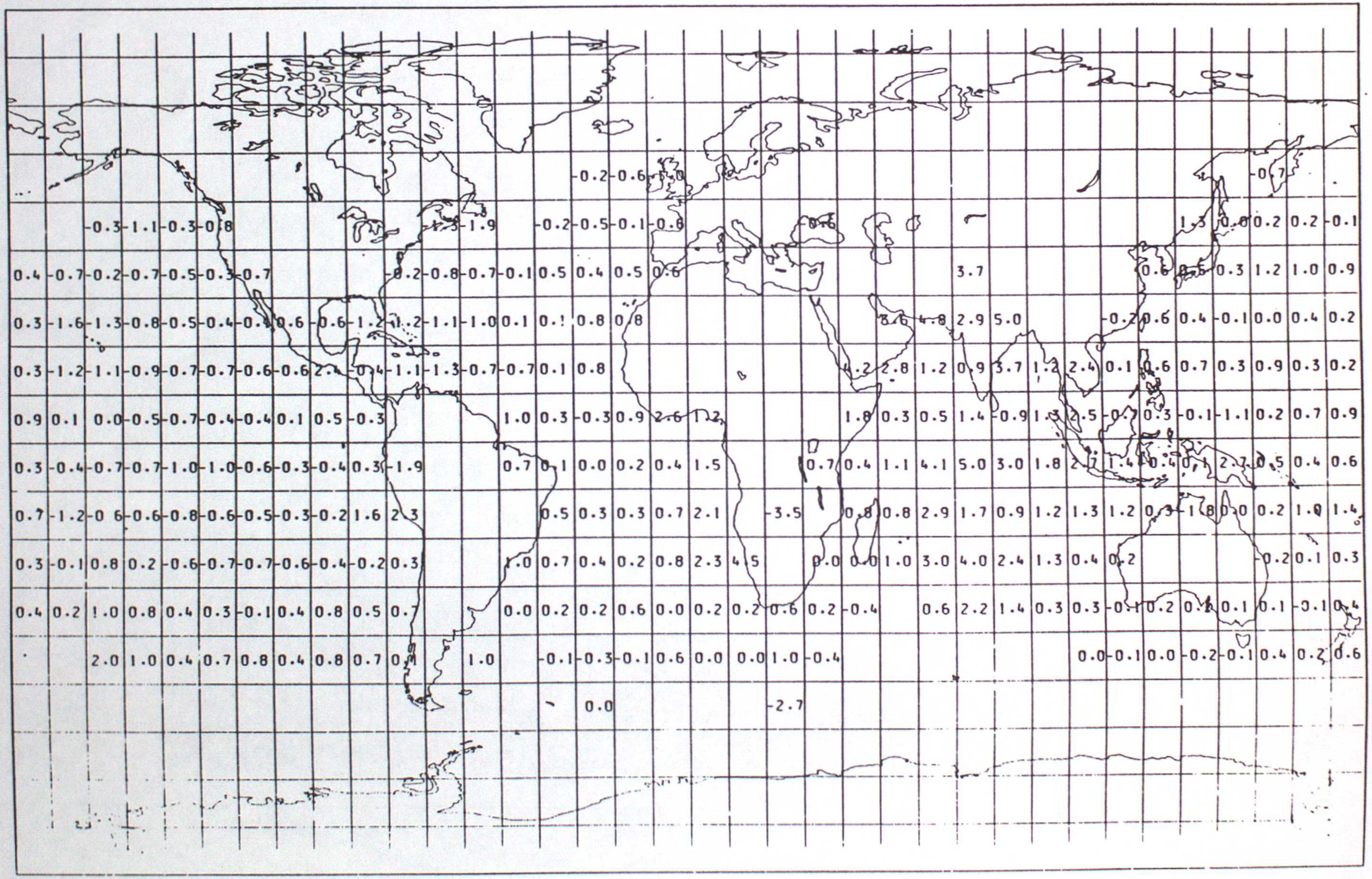
SEPTEMBER 1993

ALL OBSERVATIONS

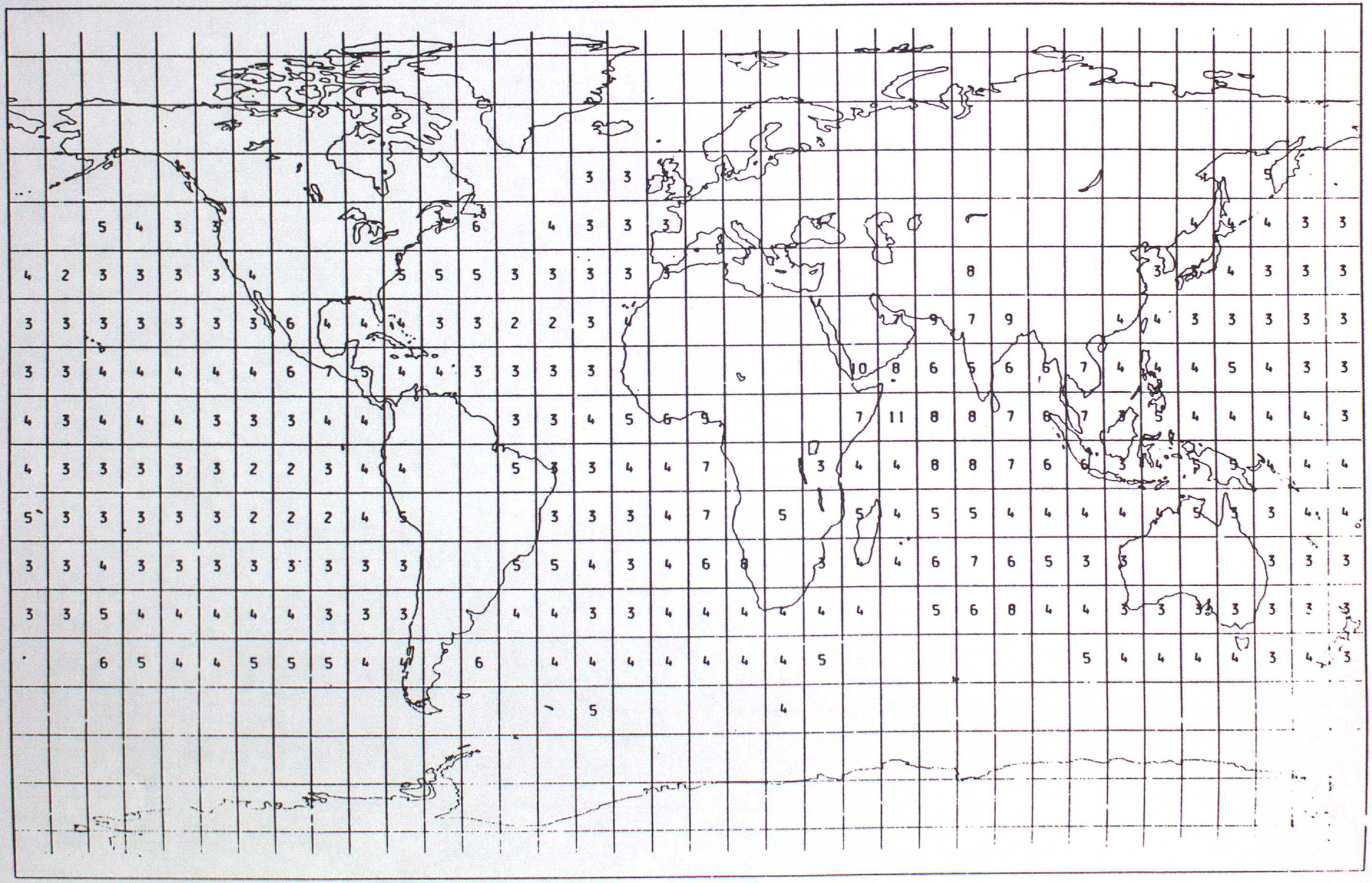
ARROWS PLOTTED WHERE > 10 OBS ARE PRESENT


REPRESENTS 5 M/S

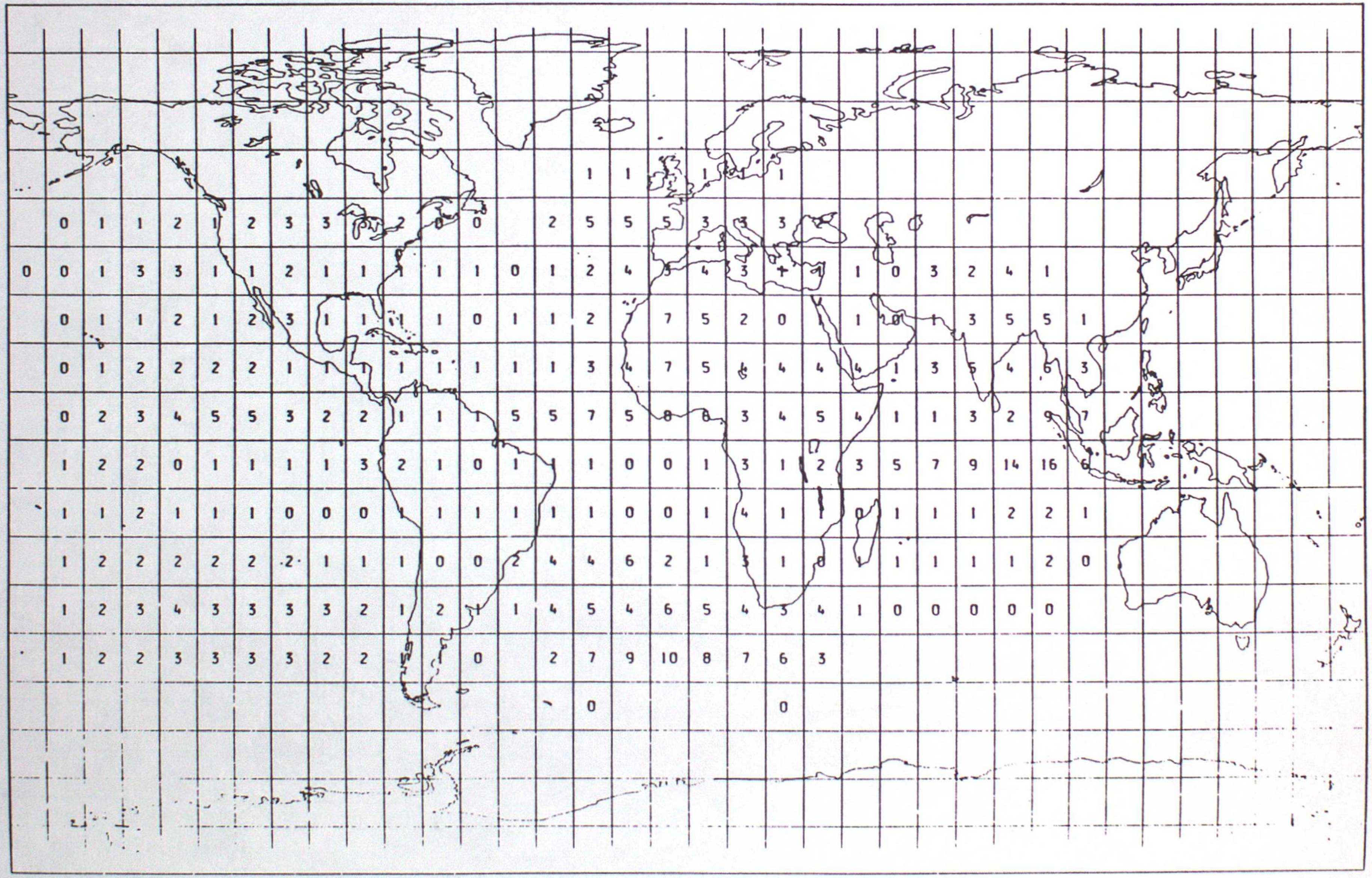
SATOBS : MEAN O-B SPEED DIFFERENCES (M/S) BETWEEN 701 AND 1000 HPA FIGURE 13
SEPTEMBER 1993
USING ALL OBSERVATIONS
VALUES ARE PRINTED WHERE > 10 OBS ARE PRESENT


-0.2 -0.6 -1.0 -0.7
-0.3 -1.1 -0.3 -0.8 -1.3 -1.9 -0.2 -0.5 -0.1 -0.8 -0.6 1.3 0.0 0.2 0.2 -0.1
0.4 -0.7 -0.2 -0.7 -0.5 -0.3 -0.7 -0.2 -0.8 -0.7 -0.1 0.5 0.4 0.5 0.6 3.7 0.6 0.5 0.3 1.2 1.0 0.9
0.3 -1.6 -1.3 -0.8 -0.5 -0.4 -0.4 0.6 -0.6 -1.2 -1.2 -1.1 -1.0 0.1 0.1 0.8 0.8 3.6 4.8 2.9 5.0 -0.2 0.6 0.4 -0.1 0.0 0.4 0.2
0.3 -1.2 -1.1 -0.9 -0.7 -0.7 -0.6 -0.6 2.4 -0.4 -1.1 -1.3 -0.7 -0.7 0.1 0.8 4.2 2.8 1.2 0.9 3.7 1.2 2.4 0.1 0.6 0.7 0.3 0.9 0.3 0.2
0.9 0.1 0.0 -0.5 -0.7 -0.4 -0.4 0.1 0.5 -0.3 1.0 0.3 -0.3 0.9 2.6 1.2 1.8 0.3 0.5 1.4 -0.9 1.3 2.5 -0.7 0.3 -0.1 -1.1 0.2 0.7 0.9
0.3 -0.4 -0.7 -0.7 -1.0 -1.0 -0.6 -0.3 -0.4 0.3 -1.9 0.7 0.1 0.0 0.2 0.4 1.5 0.7 0.4 1.1 4.1 5.0 3.0 1.8 2.7 1.4 -0.4 0.1 2.7 0.5 0.4 0.6
0.7 -1.2 -0.6 -0.6 -0.8 -0.6 -0.5 -0.3 -0.2 1.6 2.3 0.5 0.3 0.3 0.7 2.1 -3.5 0.8 0.8 2.9 1.7 0.9 1.2 1.3 1.2 0.3 -1.8 0.0 0.2 1.0 1.4
0.3 -0.1 0.8 0.2 -0.6 -0.7 -0.7 -0.6 -0.4 -0.2 0.3 1.0 0.7 0.4 0.2 0.8 2.3 4.5 0.0 0.0 1.0 3.0 4.0 2.4 1.3 0.4 0.2 -0.2 0.1 0.3
0.4 0.2 1.0 0.8 0.4 0.3 -0.1 0.4 0.8 0.5 0.7 0.0 0.2 0.2 0.6 0.0 0.2 0.2 -0.6 0.2 -0.4 0.6 2.2 1.4 0.3 0.3 -0.1 0.2 0.1 0.1 0.1 -0.1 0.4
2.0 1.0 0.4 0.7 0.8 0.4 0.8 0.7 0.1 1.0 -0.1 -0.3 -0.1 0.6 0.0 0.0 1.0 -0.4 0.0 -0.1 0.0 -0.2 -0.1 0.4 0.2 0.6
0.0 -2.7

SATOBS : RMS O-B VECTOR DIFFERENCES (M/S) BETWEEN 701 AND 1000 HPA FIGURE 14
SEPTEMBER 1993
USING ALL OBSERVATIONS
VALUES ARE PRINTED WHERE > 10 OBS ARE PRESENT

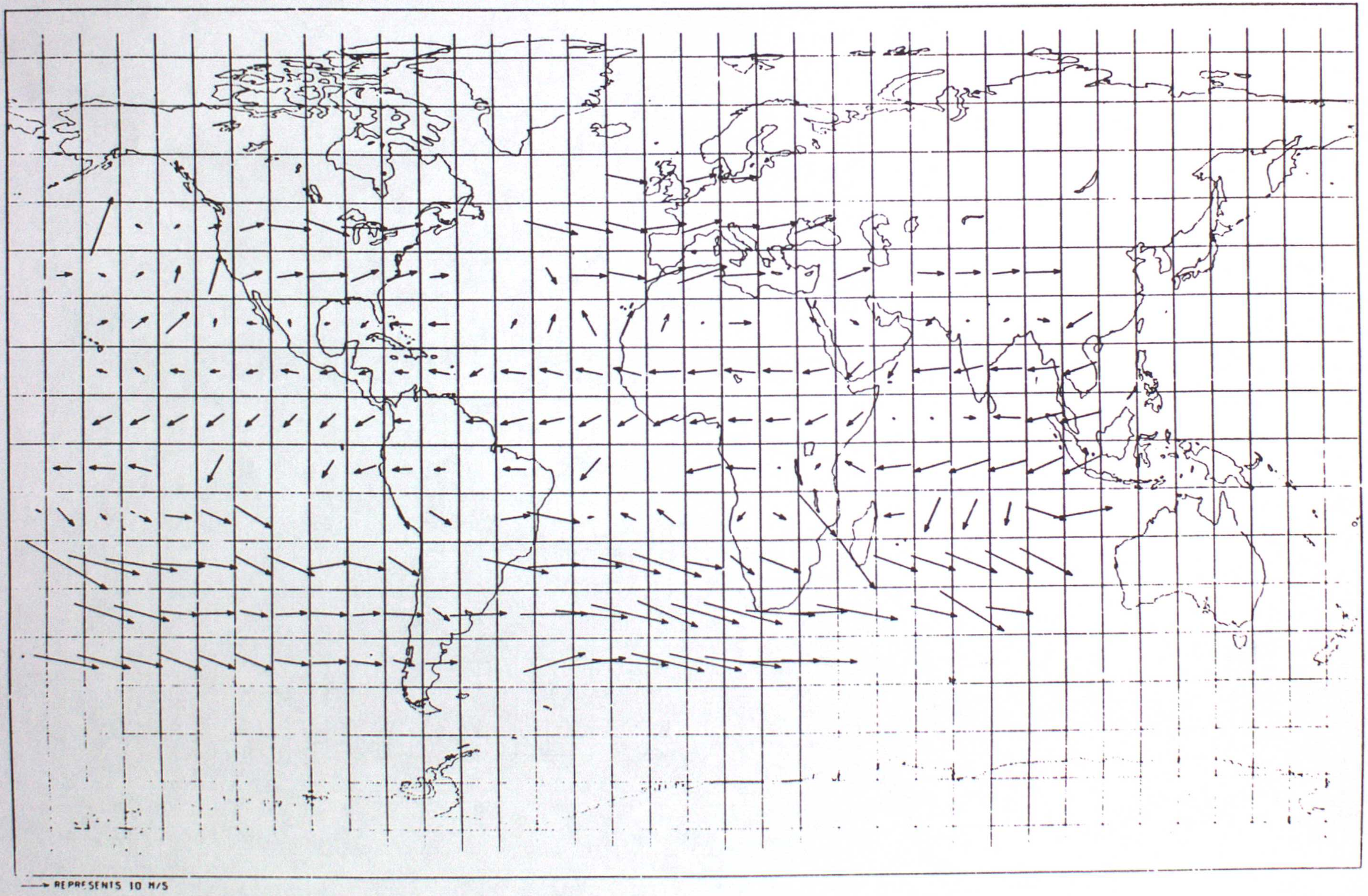

3 3 5
5 4 3 3 6 4 3 3 3 4 4 4 3 3
4 2 3 3 3 3 4 5 5 5 3 3 3 3 3 8 3 4 3 3 3
3 3 3 3 3 3 3 6 4 4 4 3 3 2 2 3 4 7 9 7 9 4 4 3 3 3 3 3
3 3 4 4 4 4 4 6 7 5 4 4 3 3 3 3 10 8 6 5 6 6 7 4 4 4 5 4 3 3
4 3 4 4 4 3 3 3 4 4 3 3 4 5 6 5 7 11 8 8 7 6 7 3 5 4 4 4 4 3
4 3 3 3 3 3 2 2 3 4 4 5 3 3 4 4 7 3 4 4 8 8 7 6 6 3 4 7 5 4 4
5 3 3 3 3 3 2 2 2 4 5 3 3 3 4 7 5 5 4 5 5 4 4 4 4 4 5 3 3 4 4
3 3 4 3 3 3 3 3 3 3 3 5 5 4 3 4 6 8 3 4 4 6 7 6 5 3 3 3 3 3
3 3 5 4 4 4 4 4 3 3 3 4 4 3 3 4 4 4 4 4 4 5 6 8 4 4 3 3 3 3 3 3 3
6 5 4 4 5 5 5 4 4 6 4 4 4 4 4 4 4 5 5 4 4 4 4 3 4 3
5 4

AVERAGE DAILY NUMBER OF SATOB OBSERVATIONS BETWEEN 401 AND 700 HPA FIGURE 15
SEPTEMBER 1993


1 1 1 1
0 1 1 2 1 2 3 3 2 0 0 2 5 5 5 3 3 3
0 0 1 3 3 1 1 2 1 1 1 1 1 0 1 2 4 3 4 3 1 1 1 0 3 2 4 1
0 1 1 2 1 2 3 1 1 1 1 0 1 1 2 7 7 5 2 0 1 1 0 1 3 5 5 1
0 1 2 2 2 2 1 1 1 1 1 1 1 1 3 4 7 5 4 4 4 4 1 3 5 4 6 3
0 2 3 4 5 5 3 2 2 1 1 1 5 5 7 5 8 8 3 4 5 4 1 1 3 2 9 7
1 2 2 0 1 1 1 1 3 2 1 0 1 1 1 0 0 1 3 1 2 3 5 7 9 14 16 6
1 1 2 1 1 1 0 0 0 1 1 1 1 1 1 0 0 1 4 1 1 0 1 1 1 2 2 1
1 2 2 2 2 2 2 1 1 1 0 0 2 4 4 6 2 1 3 1 0 1 1 1 1 1 2 0
1 2 3 4 3 3 3 3 2 1 2 1 1 4 5 4 6 5 4 3 4 1 0 0 0 0 0
1 2 2 3 3 3 3 2 2 1 1 0 2 7 9 10 8 7 6 3
0 0

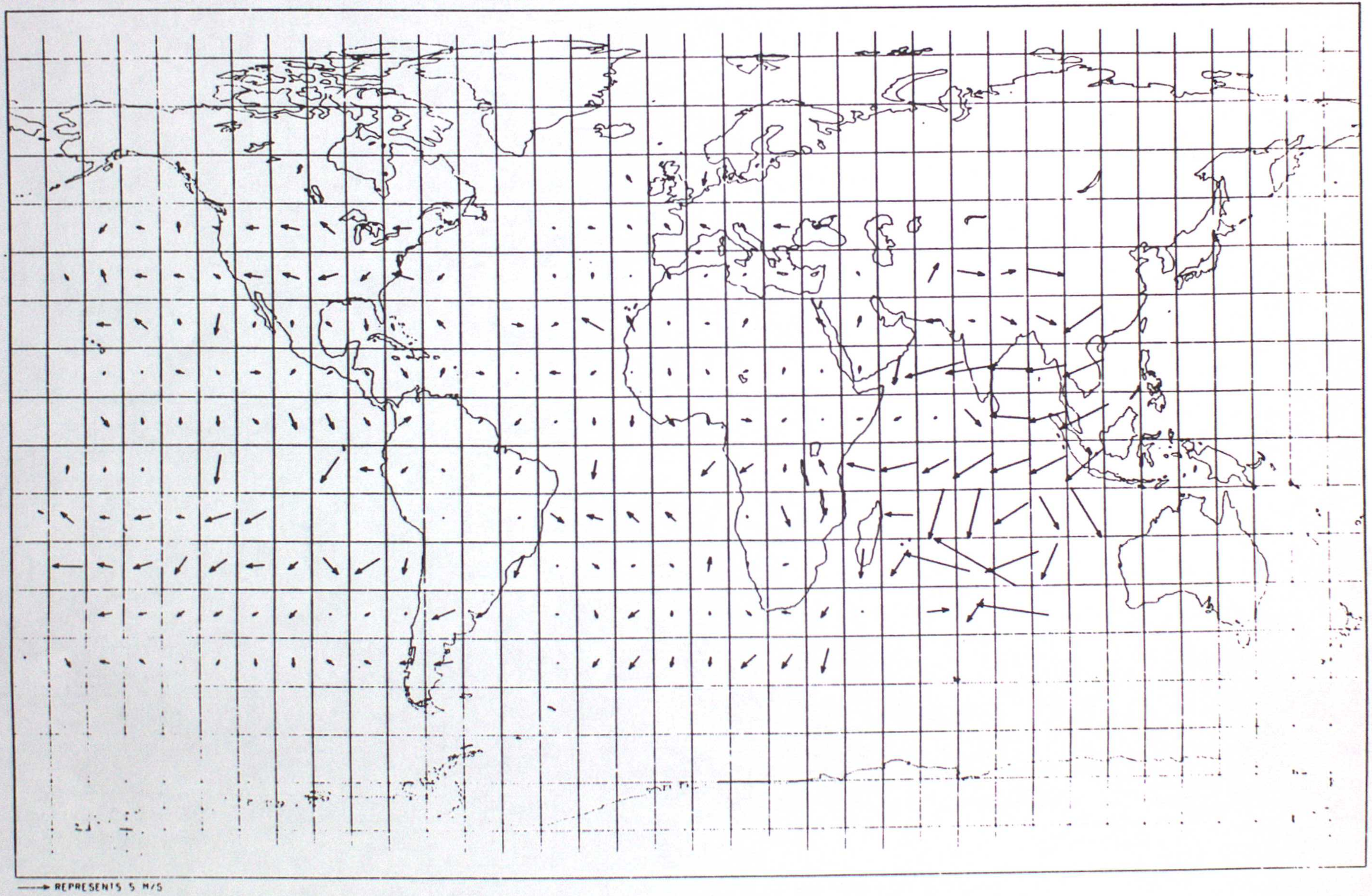
SATOB VECTOR MEAN WINDS BETWEEN 401-700 HPA
SEPTEMBER 1993
ALL OBSERVATIONS
ARROWS PLOTTED WHERE > 10 OBS ARE PRESENT

FIGURE 16

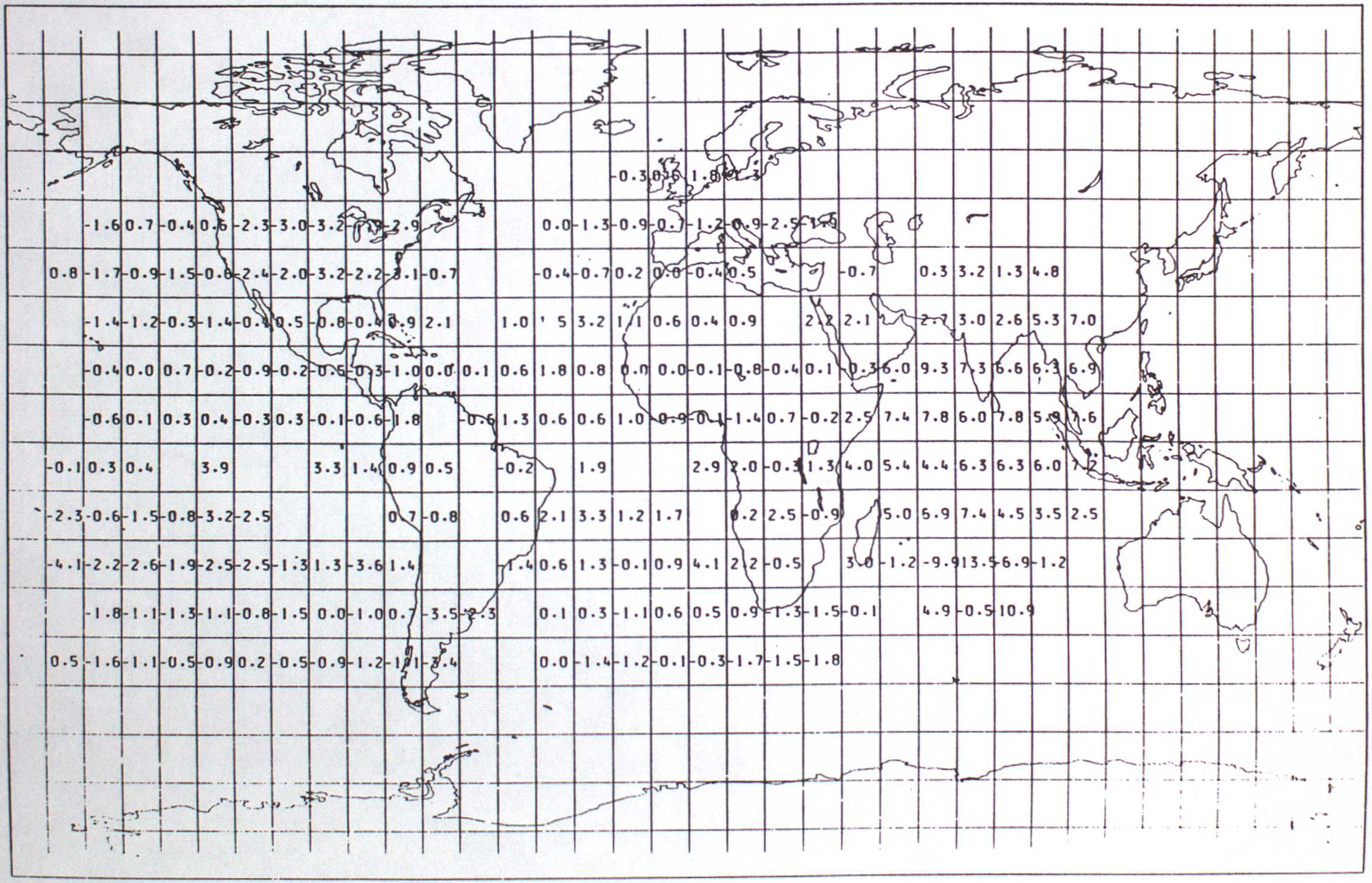

→ REPRESENTS 10 M/S

SATOB O-B VECTOR WIND DIFFERENCES BETWEEN 401-700 HPA
SEPTEMBER 1993
ALL OBSERVATIONS
ARROWS PLOTTED WHERE > 10 OBS ARE PRESENT

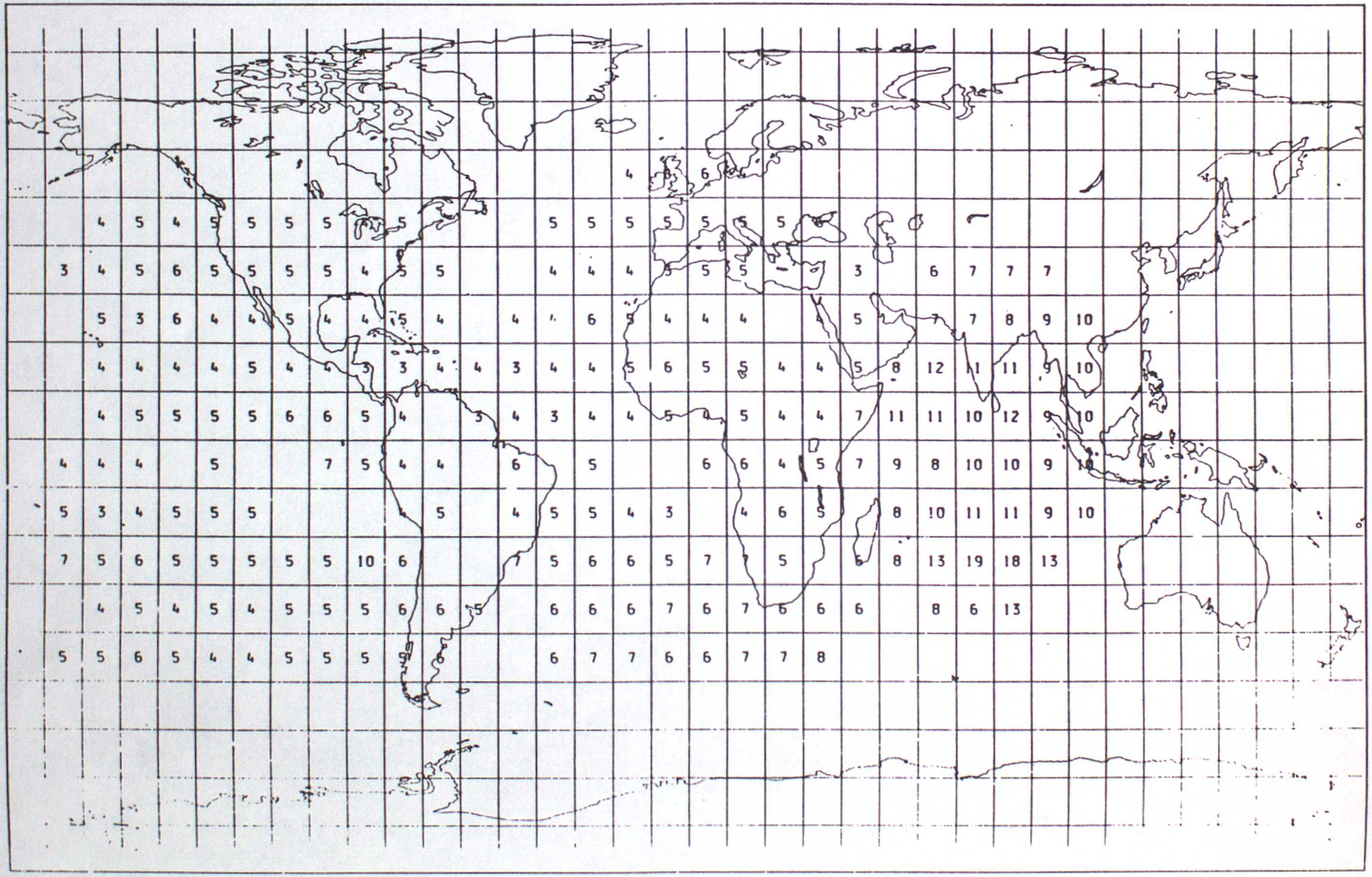
FIGURE 17


→ REPRESENTS 5 M/S

SATOBS : MEAN O-B SPEED DIFFERENCES (M/S) BETWEEN 401 AND 700 HPA FIGURE 18
SEPTEMBER 1993
USING ALL OBSERVATIONS
VALUES ARE PRINTED WHERE > 10 OBS ARE PRESENT


-0.3 0.6 1.8
-1.6 0.7 -0.4 0.6 -2.3 -3.0 -3.2 -2.9 0.0 -1.3 -0.9 -0.7 -1.2 -0.9 -2.5
0.8 -1.7 -0.9 -1.5 -0.6 -2.4 -2.0 -3.2 -2.2 -3.1 -0.7 -0.4 -0.7 0.2 0.0 -0.4 0.5 -0.7 0.3 3.2 1.3 4.8
-1.4 -1.2 -0.3 -1.4 -0.4 0.5 -0.8 -0.4 0.9 2.1 1.0 5 3.2 1.1 0.6 0.4 0.9 2.2 2.1 2.7 3.0 2.6 5.3 7.0
-0.4 0.0 0.7 -0.2 -0.9 -0.2 -0.5 0.3 -1.0 0.0 0.1 0.6 1.8 0.8 0.0 0.0 -0.1 -0.8 -0.4 0.1 -0.3 6.0 9.3 7.3 6.6 6.3 6.9
-0.6 0.1 0.3 0.4 -0.3 0.3 -0.1 -0.6 -1.8 -0.6 1.3 0.6 0.6 1.0 -0.9 -0.1 -1.4 0.7 -0.2 2.5 7.4 7.8 6.0 7.8 5.9 7.6
-0.1 0.3 0.4 3.9 3.3 1.4 0.9 0.5 -0.2 1.9 2.9 2.0 -0.3 1.3 4.0 5.4 4.4 6.3 6.3 6.0 7.2
-2.3 -0.6 -1.5 -0.8 -3.2 -2.5 0.7 -0.8 0.6 2.1 3.3 1.2 1.7 0.2 2.5 -0.9 5.0 5.9 7.4 4.5 3.5 2.5
-4.1 -2.2 -2.6 -1.9 -2.5 -2.5 -1.3 1.3 -3.6 1.4 -1.4 0.6 1.3 -0.1 0.9 4.1 2.2 -0.5 3.0 -1.2 -9.9 13.5 -6.9 -1.2
-1.8 -1.1 -1.3 -1.1 -0.8 -1.5 0.0 -1.0 0.7 -3.5 -2.3 0.1 0.3 -1.1 0.6 0.5 0.9 -1.3 -1.5 -0.1 4.9 -0.5 10.9
0.5 -1.6 -1.1 -0.5 -0.9 0.2 -0.5 -0.9 -1.2 -1.1 -3.4 0.0 -1.4 -1.2 -0.1 -0.3 -1.7 -1.5 -1.8

SATOBS : RMS O-B VECTOR DIFFERENCES (M/S) BETWEEN 401 ANC 700 HPA FIGURE 19
SEPTEMBER 1993
USING ALL OBSERVATIONS
VALUES ARE PRINTED WHERE > 10 OBS ARE PRESENT


4 6
4 5 4 5 5 5 5 5 5 5 5 5 5 5 5
3 4 5 6 5 5 5 5 4 5 5 4 4 4 5 5 5 3 6 7 7 7
5 3 6 4 4 5 4 4 5 4 4 4 6 5 4 4 4 5 7 7 8 9 10
4 4 4 4 5 4 4 3 3 4 4 3 4 4 5 6 5 5 4 4 5 8 12 11 11 9 10
4 5 5 5 5 6 6 5 4 3 4 3 4 4 5 4 5 4 4 7 11 11 10 12 9 10
4 4 4 5 7 5 4 4 6 5 6 6 4 5 7 9 8 10 10 9 10
5 3 4 5 5 5 4 5 4 5 5 4 3 4 6 5 8 10 11 11 9 10
7 5 6 5 5 5 5 5 10 6 7 5 6 6 5 7 7 5 6 8 13 19 18 13
4 5 4 5 4 5 5 5 6 6 5 6 6 6 7 6 7 6 6 6 8 6 13
5 5 6 5 4 4 5 5 5 5 6 6 7 7 6 6 7 7 8

AVERAGE DAILY NUMBER OF SATOB OBSERVATIONS BETWEEN 101 AND 400 HPA FIGURE 20
SEPTEMBER 1993

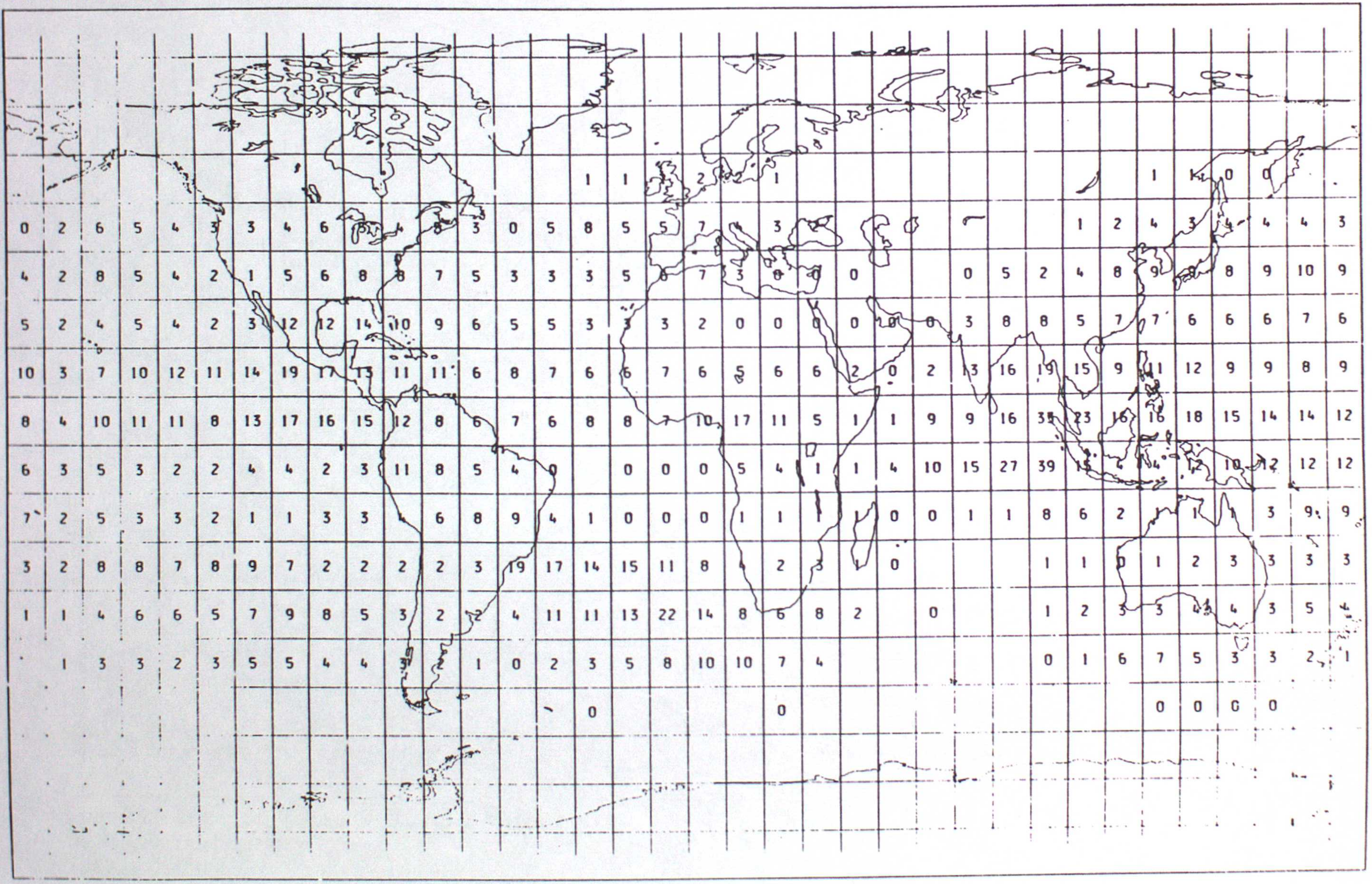
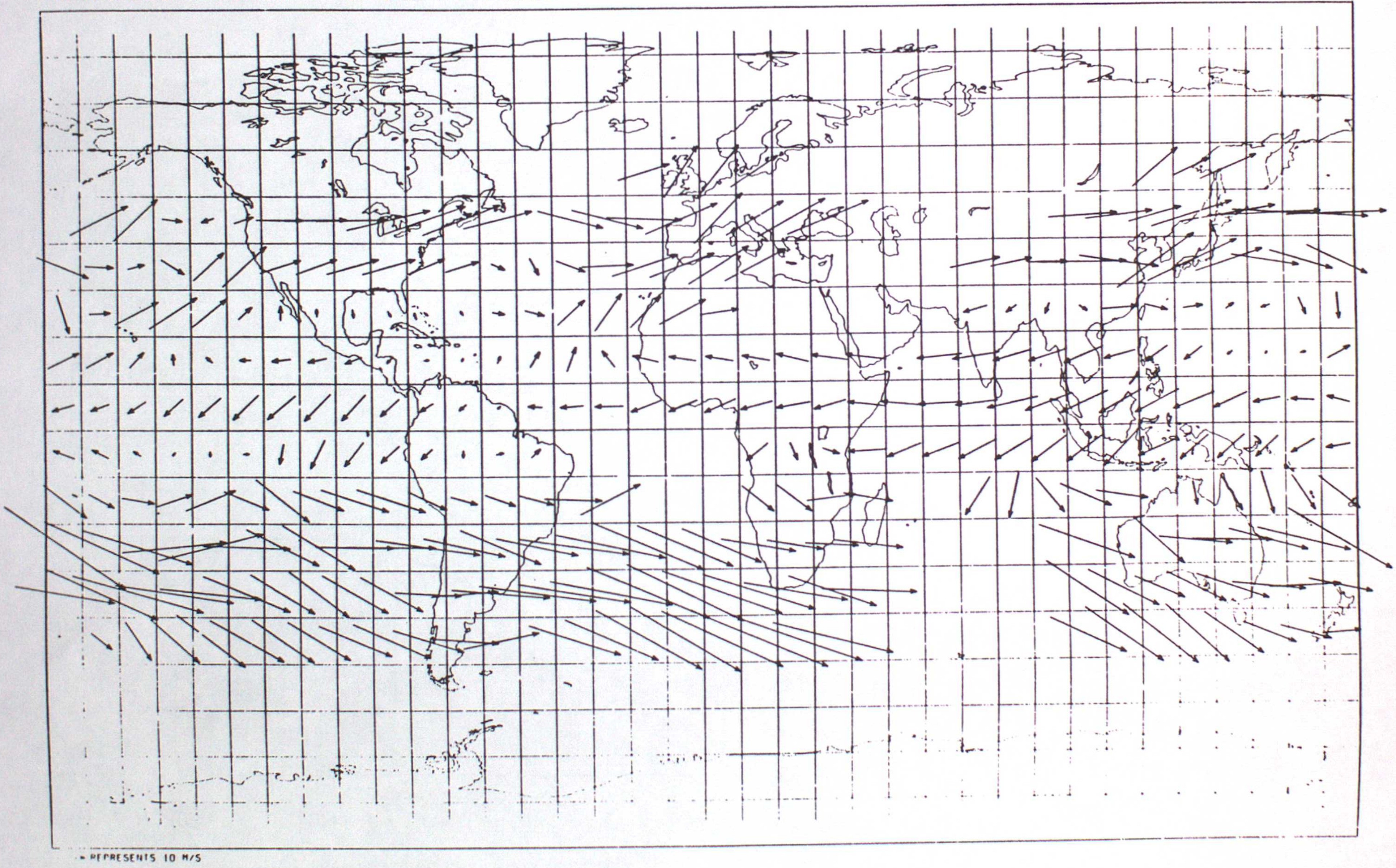

1 1 2 2 1 1 1 0 0
0 2 6 5 4 3 3 4 6 5 4 8 3 0 5 8 5 5 7 4 3 2 1 2 4 3 4 4 4 3
4 2 8 5 4 2 1 5 6 8 8 7 5 3 3 3 5 6 7 3 0 0 0 0 5 2 4 8 9 8 8 9 10 9
5 2 4 5 4 2 3 12 12 14 10 9 6 5 5 3 3 3 2 0 0 0 0 0 0 3 8 8 5 7 7 6 6 6 7 6
10 3 7 10 12 11 14 19 17 13 11 11 6 8 7 6 6 7 6 5 6 6 2 0 2 13 16 19 15 9 11 12 9 9 8 9
8 4 10 11 11 8 13 17 16 15 12 8 6 7 6 8 8 7 10 17 11 5 1 1 9 9 16 35 23 16 16 18 15 14 14 12
6 3 5 3 2 2 4 4 2 3 11 8 5 4 0 0 0 0 5 4 1 1 4 10 15 27 39 15 4 4 12 10 12 12 12
7 2 5 3 3 2 1 1 3 3 4 6 8 9 4 1 0 0 0 1 1 1 1 0 0 1 1 8 6 2 1 1 1 3 9 9
3 2 8 8 7 8 9 7 2 2 2 2 3 19 17 14 15 11 8 4 2 3 1 0 1 1 0 1 2 3 3 3 3
1 1 4 6 6 5 7 9 8 5 3 2 2 4 11 11 13 22 14 8 6 8 2 0 1 2 3 3 4 4 3 5 4
1 3 3 2 3 5 5 4 4 3 2 1 0 2 3 5 8 10 10 7 4 0 1 6 7 5 3 3 2 1
0 0 0 0 0 0

FIGURE 21

SATOB VECTOR MEAN WINDS BETWEEN 101-400 HPA
SEPTEMBER 1993
ALL OBSERVATIONS
ARROWS PLOTTED WHERE > 10 OBS ARE PRESENT

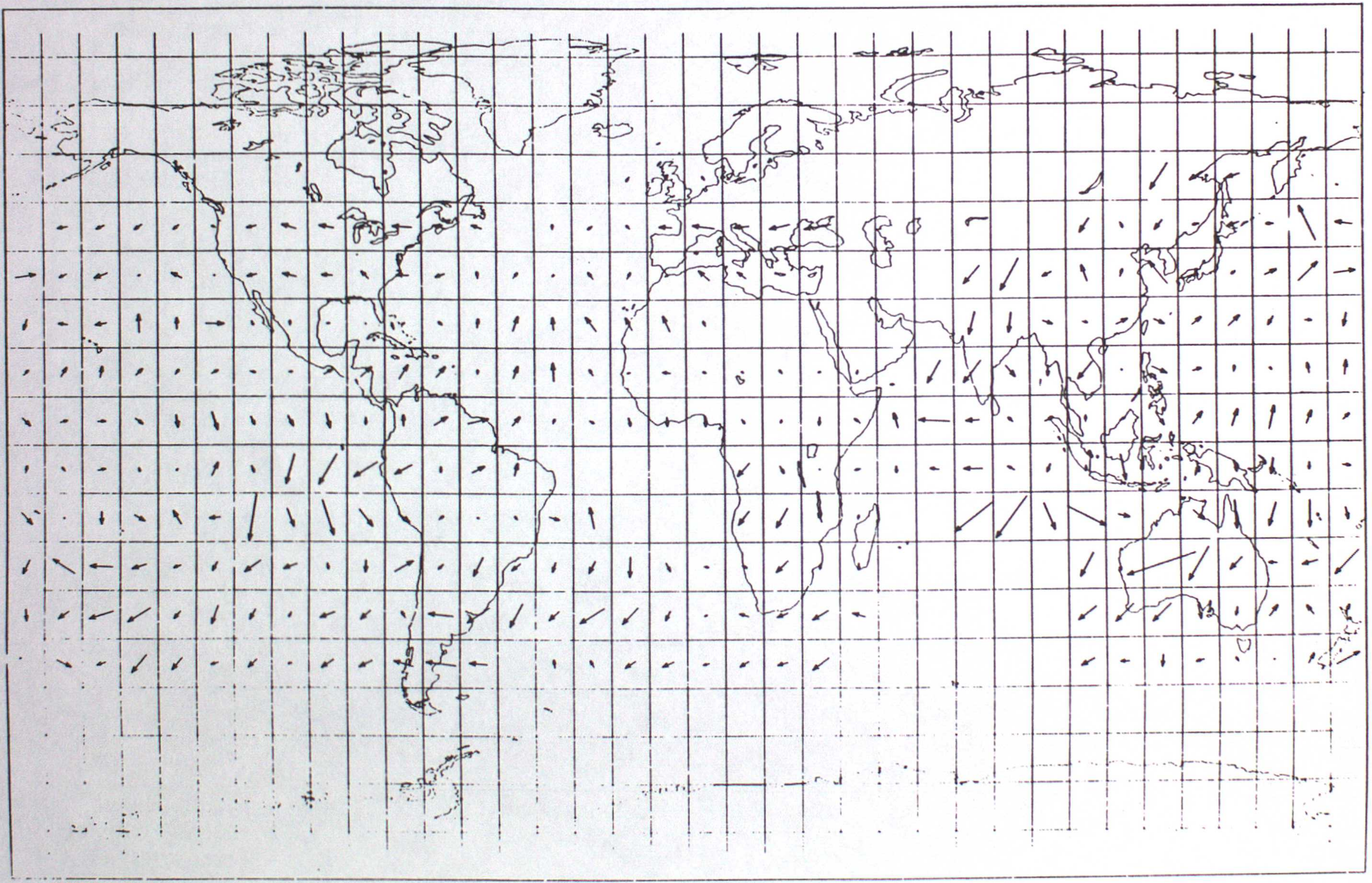

REPRESENTS 10 M/S

SATOB O-B VECTOR WIND DIFFERENCES BETWEEN 101-400 HPA FIGURE 22

SEPTEMBER 1993

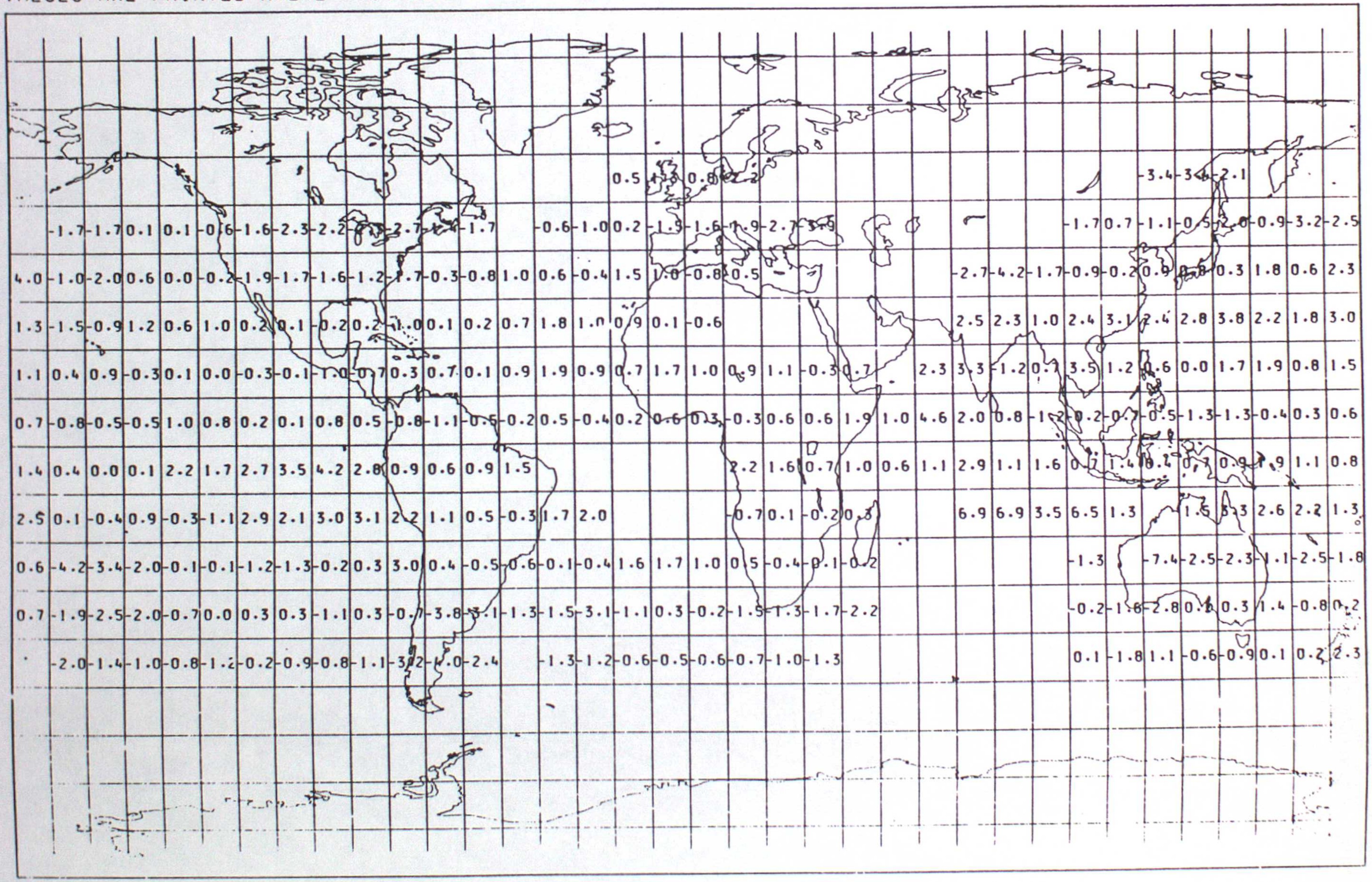
ALL OBSERVATIONS

ARROWS PLOTTED WHERE > 10 OBS ARE PRESENT

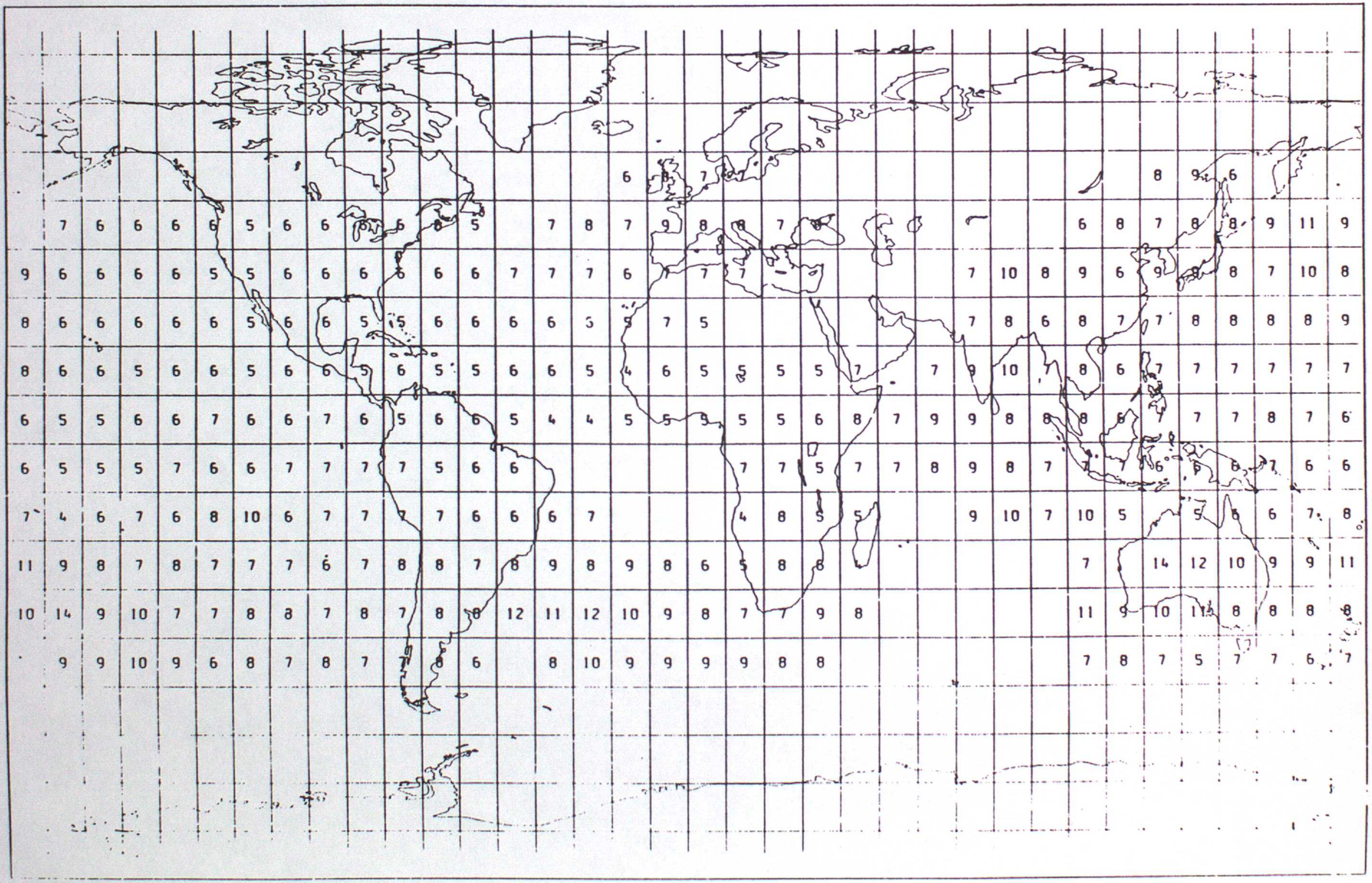


→ REPRESENTS 5 M/S

SATOBS : MEAN O-B SPEED DIFFERENCES (M/S) BETWEEN 101 AND 400 HPA FIGURE 23
SEPTEMBER 1993
USING ALL OBSERVATIONS
VALUES ARE PRINTED WHERE > 10 OBS ARE PRESENT


0.5 1.3 0.8 2.2 -3.4 -3.4 -2.1
-1.7 -1.7 0.1 0.1 -0.6 -1.6 -2.3 -2.2 -2.3 -2.7 -1.4 -1.7 -0.6 -1.0 0.2 -1.3 -1.6 -1.9 -2.7 -3.9 -1.7 0.7 -1.1 -0.5 -2.0 -0.9 -3.2 -2.5
4.0 -1.0 -2.0 0.6 0.0 -0.2 -1.9 -1.7 -1.6 -1.2 -1.7 -0.3 -0.8 1.0 0.6 -0.4 1.5 1.0 -0.8 0.5 -2.7 -4.2 -1.7 -0.9 -0.2 0.9 0.8 0.3 1.8 0.6 2.3
1.3 -1.5 -0.9 1.2 0.6 1.0 0.2 0.1 -0.2 0.2 -1.0 0.1 0.2 0.7 1.8 1.0 0.9 0.1 -0.6 2.5 2.3 1.0 2.4 3.1 2.4 2.8 3.8 2.2 1.8 3.0
1.1 0.4 0.9 -0.3 0.1 0.0 -0.3 -0.1 -1.0 -0.7 0.3 0.7 0.1 0.9 1.9 0.9 0.7 1.7 1.0 0.9 1.1 -0.3 0.7 2.3 3.3 -1.2 0.7 3.5 1.2 0.6 0.0 1.7 1.9 0.8 1.5
0.7 -0.8 -0.5 -0.5 1.0 0.8 0.2 0.1 0.8 0.5 -0.8 -1.1 -0.5 -0.2 0.5 -0.4 0.2 0.6 0.3 -0.3 0.6 0.6 1.9 1.0 4.6 2.0 0.8 -1.2 -0.2 -0.7 -0.5 -1.3 -1.3 -0.4 0.3 0.6
1.4 0.4 0.0 0.1 2.2 1.7 2.7 3.5 4.2 2.8 0.9 0.6 0.9 1.5 2.2 1.6 0.7 1.0 0.6 1.1 2.9 1.1 1.6 0.7 1.4 0.4 0.7 0.9 1.9 1.1 0.8
2.5 0.1 -0.4 0.9 -0.3 -1.1 2.9 2.1 3.0 3.1 2.2 1.1 0.5 -0.3 1.7 2.0 -0.7 0.1 -0.2 0.3 6.9 6.9 3.5 6.5 1.3 1.5 3.3 2.6 2.2 1.3
0.6 -4.2 -3.4 -2.0 -0.1 -0.1 -1.2 -1.3 -0.2 0.3 3.0 0.4 -0.5 -0.6 -0.1 -0.4 1.6 1.7 1.0 0.5 -0.4 -0.1 -0.2 -1.3 -7.4 -2.5 -2.3 -1.1 -2.5 -1.8
0.7 -1.9 -2.5 -2.0 -0.7 0.0 0.3 0.3 -1.1 0.3 -0.7 -3.8 -3.1 -1.3 -1.5 -3.1 -1.1 0.3 -0.2 -1.5 -1.3 -1.7 -2.2 -0.2 -1.6 -2.8 0.0 0.3 1.4 -0.8 0.2
-2.0 -1.4 -1.0 -0.8 -1.2 -0.2 -0.9 -0.8 -1.1 -3.2 -4.0 -2.4 -1.3 -1.2 -0.6 -0.5 -0.6 -0.7 -1.0 -1.3 0.1 -1.8 1.1 -0.6 -0.9 0.1 0.2 2.3

SATOBS : RMS O-B VECTOR DIFFERENCES (M/S) BETWEEN 101 AND 400 HPA FIGURE 24
SEPTEMBER 1993
USING ALL OBSERVATIONS
VALUES ARE PRINTED WHERE > 10 OBS ARE PRESENT


6 8 7 8 9 6
7 6 6 6 6 5 6 6 6 6 8 5 7 8 7 9 8 8 7 8 6 8 7 8 8 9 11 9
9 6 6 6 6 5 5 6 6 6 6 6 6 7 7 7 6 7 7 7 7 10 8 9 6 9 8 8 7 10 8
8 6 6 6 6 6 5 6 6 5 5 6 6 6 6 5 5 7 5 7 8 6 8 7 7 8 8 8 8 9
8 6 6 5 6 6 5 6 6 5 6 5 5 6 6 5 4 6 5 5 5 5 7 7 9 10 7 8 6 7 7 7 7 7 7
6 5 5 6 6 7 6 6 7 6 5 6 6 5 4 4 5 5 5 5 5 6 8 7 9 9 8 8 8 6 7 7 7 8 7 6
6 5 5 5 7 6 6 7 7 7 7 5 6 6 7 7 5 7 7 8 9 8 7 7 7 6 6 6 7 6 6
7 4 6 7 6 8 10 6 7 7 7 7 6 6 6 7 4 8 5 5 9 10 7 10 5 5 6 6 7 8
11 9 8 7 8 7 7 7 6 7 8 8 7 8 9 8 9 8 6 5 8 8 7 14 12 10 9 9 11
10 14 9 10 7 7 8 8 7 8 7 8 8 12 11 12 10 9 8 7 7 9 8 11 9 10 11 8 8 8 8
9 9 10 9 6 8 7 8 7 7 8 6 8 10 9 9 9 9 8 8 7 8 7 5 7 7 6 7

MONITORING OF SATELLITE TEMPERATURES

MONITORING CENTRE: BRACKNELL

MONTH: September, 93

Monitoring procedures

Period :One calendar month.

Data monitored :Reports from NOAA-11, NOAA-12 500 km.

Standard of comparison :Background field from Bracknell global model.

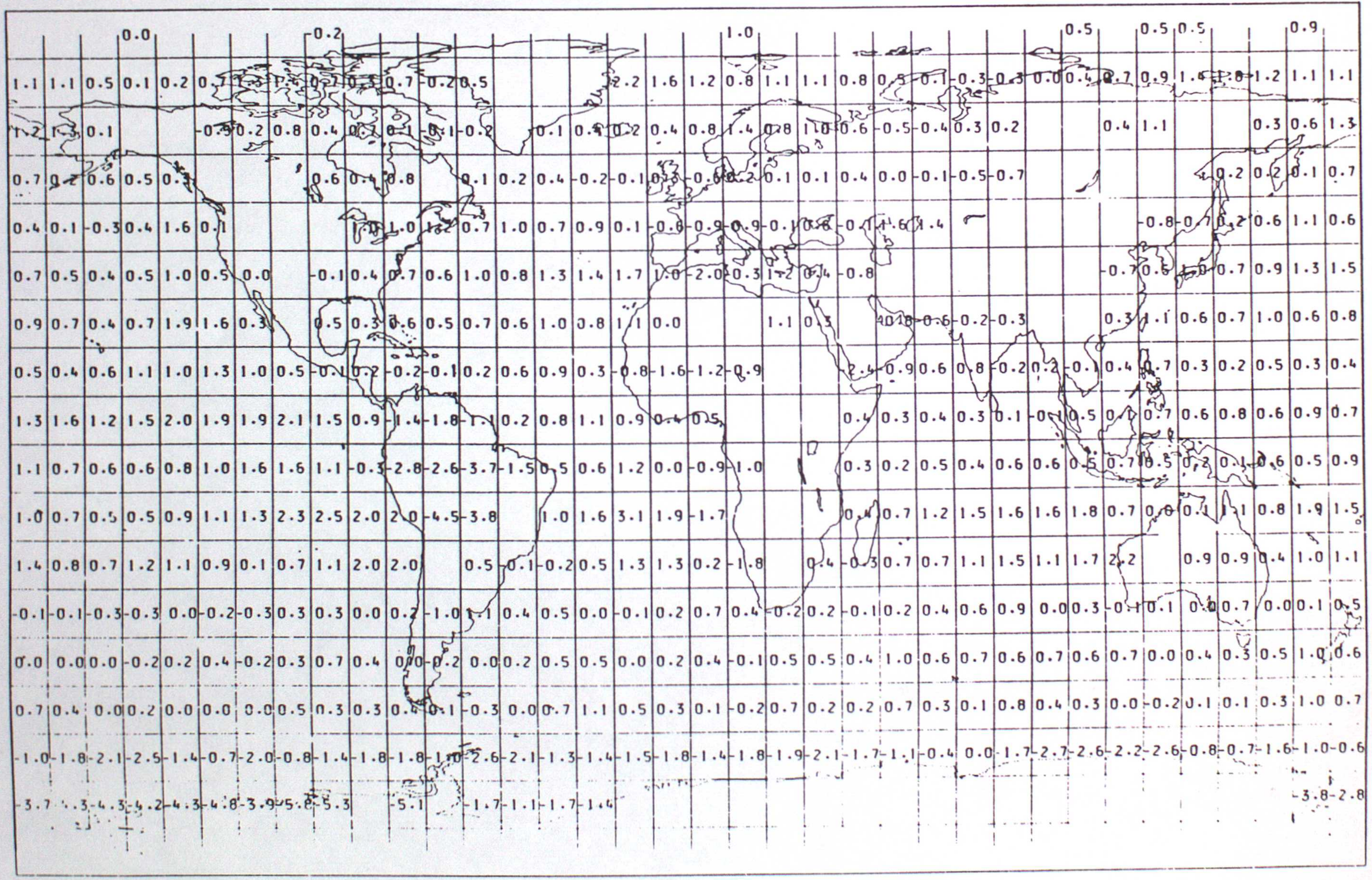
Selection Criteria :All SATEM soundings where number of observations > 30.

Data Extracted :Layer:
850 - 1000 hPa
100 - 300 hPa
30 - 50 hPa

:Mean observation minus background temperature differences

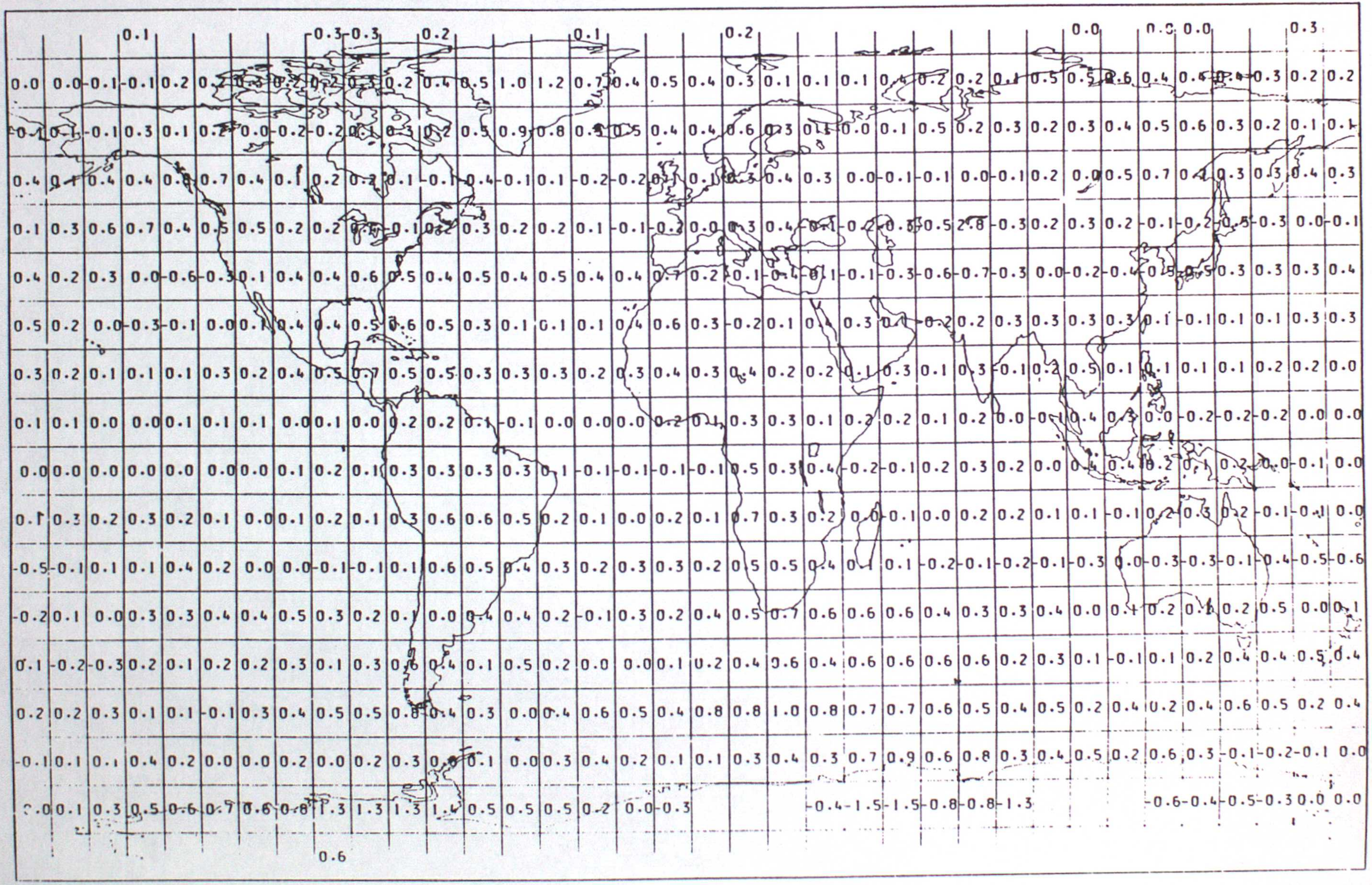
500 KM SATEMS : MEAN O-B TEMPERATURE DIFFERENCES (DEG C) : 850 TO 1000 HPA
SEPTEMBER 1993
NOAA-11. USING ALL OBSERVATIONS
VALUES ARE PRINTED WHERE > 30 OBS ARE PRESENT

FIGURE 25



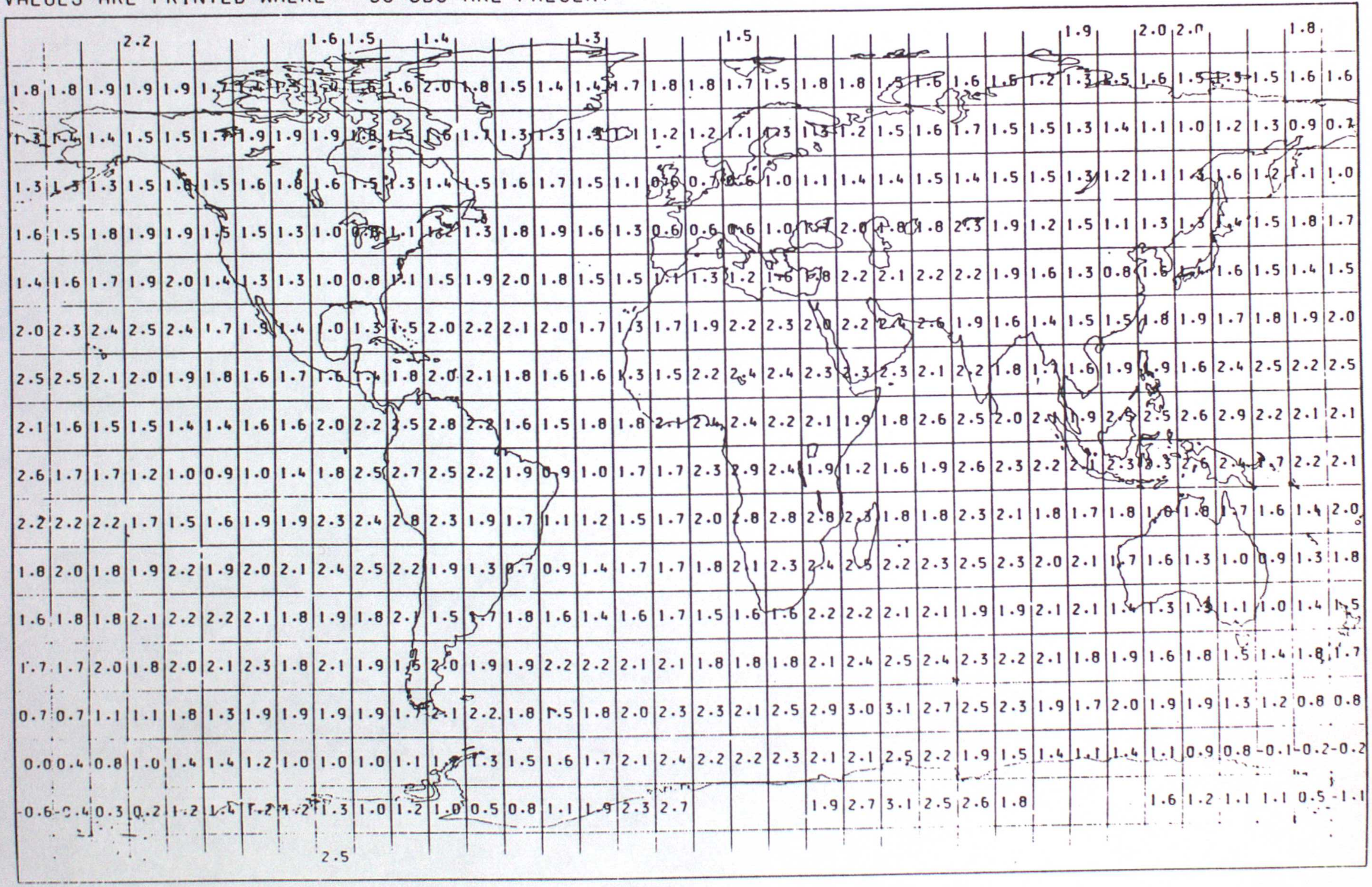
500 KM SATEMS : MEAN O-B TEMPERATURE DIFFERENCES (DEG C) : 100 TO 300 HPA
SEPTEMBER 1993
NOAA-11. USING ALL OBSERVATIONS
VALUES ARE PRINTED WHERE > 30 OBS ARE PRESENT

FIGURE 26



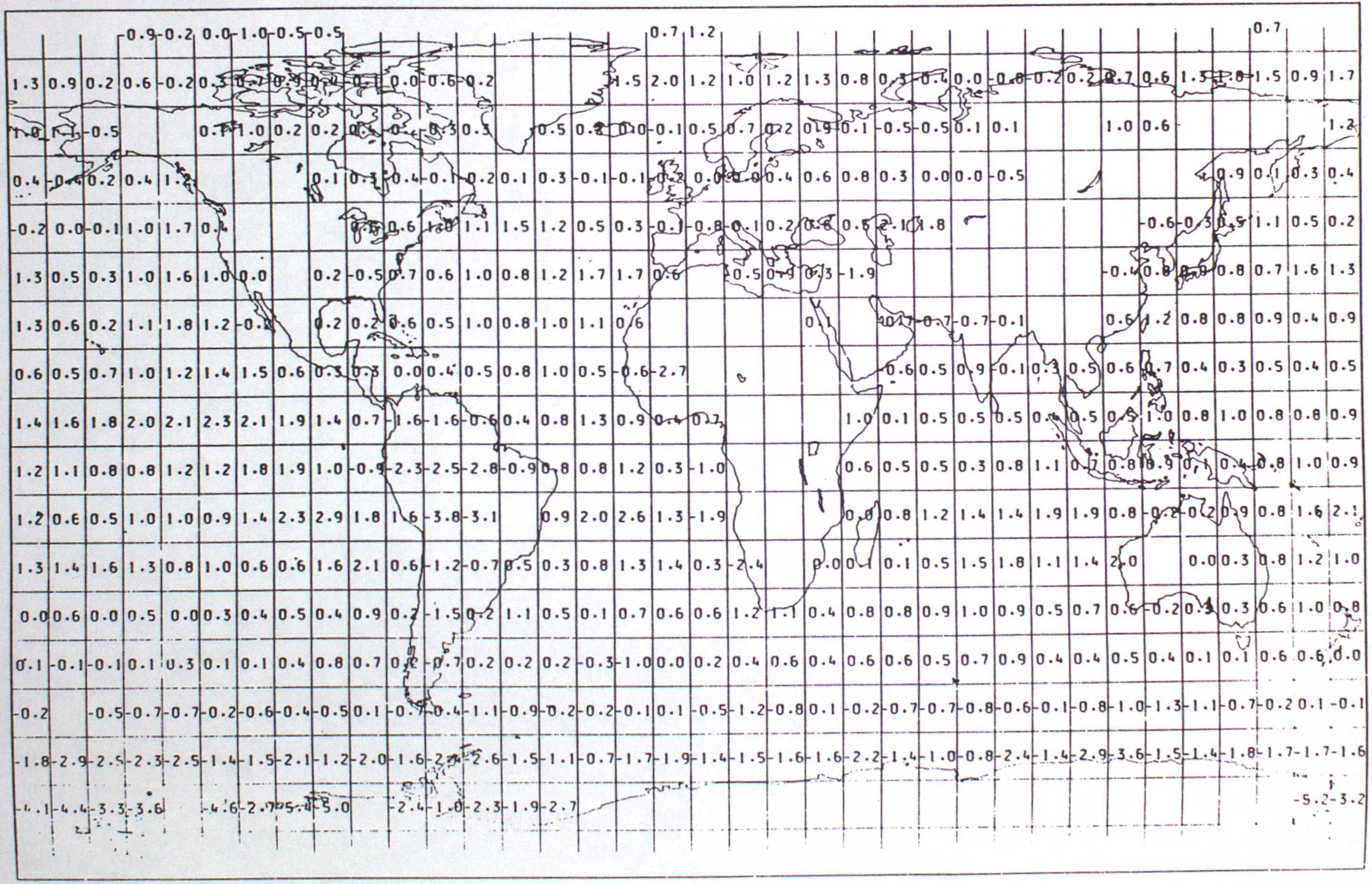
500 KM SATEMS : MEAN O-B TEMPERATURE DIFFERENCES (DEG C) : 30 TO 50 HPA
SEPTEMBER 1993
NOAA-11. USING ALL OBSERVATIONS
VALUES ARE PRINTED WHERE > 30 OBS ARE PRESENT

FIGURE 27


2.2 1.6 1.5 1.4 1.3 1.5 1.9 2.0 2.0 1.8
1.8 1.8 1.9 1.9 1.9 1.7 1.6 2.0 1.8 1.5 1.4 1.4 1.7 1.8 1.8 1.7 1.5 1.8 1.8 1.5 1.6 1.6 1.6 1.2 1.3 2.5 1.6 1.5 1.5 1.5 1.6 1.6
1.3 1.4 1.4 1.5 1.5 1.7 1.9 1.9 1.9 1.8 1.5 1.6 1.7 1.3 1.3 1.3 1.1 1.2 1.2 1.1 1.3 1.3 1.2 1.5 1.6 1.7 1.5 1.5 1.3 1.4 1.1 1.0 1.2 1.3 0.9 0.7
1.3 1.3 1.3 1.5 1.8 1.5 1.6 1.8 1.6 1.5 1.3 1.4 1.5 1.6 1.7 1.5 1.1 0.6 0.7 0.6 1.0 1.1 1.4 1.4 1.5 1.4 1.5 1.5 1.3 1.2 1.1 1.4 1.6 1.2 1.1 1.0
1.6 1.5 1.8 1.9 1.9 1.5 1.5 1.3 1.0 0.8 1.1 1.2 1.3 1.8 1.9 1.6 1.3 0.6 0.6 0.6 1.0 1.7 2.0 1.8 1.8 2.3 1.9 1.2 1.5 1.1 1.3 1.3 1.4 1.5 1.8 1.7
1.4 1.6 1.7 1.9 2.0 1.4 1.3 1.3 1.0 0.8 1.1 1.5 1.9 2.0 1.8 1.5 1.5 1.1 1.3 1.2 1.6 1.8 2.2 2.1 2.2 2.2 1.9 1.6 1.3 0.8 1.6 1.6 1.6 1.5 1.4 1.5
2.0 2.3 2.4 2.5 2.4 1.7 1.9 1.4 1.0 1.3 1.5 2.0 2.2 2.1 2.0 1.7 1.3 1.7 1.9 2.2 2.3 2.0 2.2 2.6 2.6 1.9 1.6 1.4 1.5 1.5 1.8 1.9 1.7 1.8 1.9 2.0
2.5 2.5 2.1 2.0 1.9 1.8 1.6 1.7 1.6 1.4 1.8 2.0 2.1 1.8 1.6 1.6 1.3 1.5 2.2 2.4 2.4 2.3 2.3 2.3 2.1 2.2 1.8 1.7 1.6 1.9 1.9 1.6 2.4 2.5 2.2 2.5
2.1 1.6 1.5 1.5 1.4 1.4 1.6 1.6 2.0 2.2 2.5 2.8 2.8 1.6 1.5 1.8 1.8 2.1 2.4 2.4 2.2 2.1 1.9 1.8 2.6 2.5 2.0 2.1 1.9 2.5 2.5 2.6 2.9 2.2 2.1 2.1
2.6 1.7 1.7 1.2 1.0 0.9 1.0 1.4 1.8 2.5 2.7 2.5 2.2 1.9 0.9 1.0 1.7 1.7 2.3 2.9 2.4 1.9 1.2 1.6 1.9 2.6 2.3 2.2 2.1 2.3 3.3 2.6 2.4 2.7 2.2 2.1
2.2 2.2 2.2 1.7 1.5 1.6 1.9 1.9 2.3 2.4 2.8 2.3 1.9 1.7 1.1 1.2 1.5 1.7 2.0 2.8 2.8 2.8 2.3 1.8 1.8 2.3 2.1 1.8 1.7 1.8 1.0 1.8 1.7 1.6 1.4 2.0
1.8 2.0 1.8 1.9 2.2 1.9 2.0 2.1 2.4 2.5 2.2 1.9 1.3 0.7 0.9 1.4 1.7 1.7 1.8 2.1 2.3 2.4 2.5 2.2 2.3 2.5 2.3 2.0 2.1 1.7 1.6 1.3 1.0 0.9 1.3 1.8
1.6 1.8 1.8 2.1 2.2 2.2 2.1 1.8 1.9 1.8 2.1 1.5 1.7 1.8 1.6 1.4 1.6 1.7 1.5 1.6 1.6 2.2 2.2 2.1 2.1 1.9 1.9 2.1 2.1 1.4 1.3 1.3 1.1 1.0 1.4 1.5
1.7 1.7 2.0 1.8 2.0 2.1 2.3 1.8 2.1 1.9 1.6 2.0 1.9 1.9 2.2 2.2 2.1 2.1 1.8 1.8 1.8 2.1 2.4 2.5 2.4 2.3 2.2 2.1 1.8 1.9 1.6 1.8 1.5 1.4 1.8 1.7
0.7 0.7 1.1 1.1 1.8 1.3 1.9 1.9 1.9 1.9 1.7 2.1 2.2 1.8 1.5 1.8 2.0 2.3 2.3 2.1 2.5 2.9 3.0 3.1 2.7 2.5 2.3 1.9 1.7 2.0 1.9 1.9 1.3 1.2 0.8 0.8
0.0 0.4 0.8 1.0 1.4 1.4 1.2 1.0 1.0 1.0 1.1 1.1 1.3 1.5 1.6 1.7 2.1 2.4 2.2 2.2 2.3 2.1 2.1 2.5 2.2 1.9 1.5 1.4 1.1 1.4 1.1 0.9 0.8 -0.1 -0.2 -0.2
-0.6 -0.4 0.3 0.2 1.2 1.4 1.2 1.2 1.3 1.0 1.2 1.0 0.5 0.8 1.1 1.9 2.3 2.7 1.9 2.7 3.1 2.5 2.6 1.8 1.6 1.2 1.1 1.1 0.5 -1.1
2.5

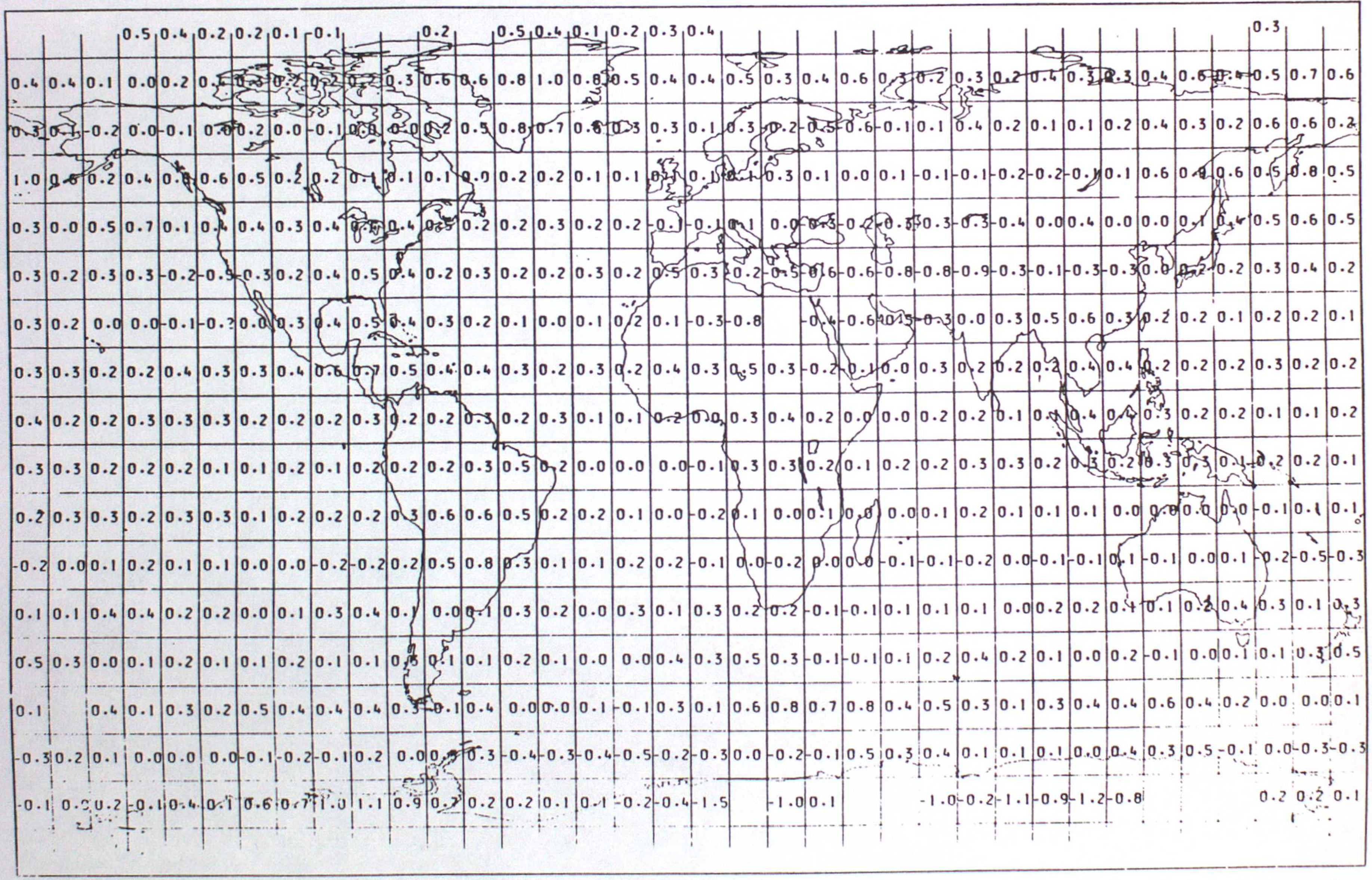
500 KM SATEMS : MEAN O-B TEMPERATURE DIFFERENCES (DEG C) : 850 TO 1000 HPA
SEPTEMBER 1993
NOAA-12. USING ALL OBSERVATIONS
VALUES ARE PRINTED WHERE > 30 OBS ARE PRESENT

FIGURE 28


-0.9 -0.2 0.0 -1.0 -0.5 -0.5 0.7 1.2 0.7
1.3 0.9 0.2 0.6 -0.2 0.3 -0.7 -0.9 -0.4 -0.1 0.0 -0.6 -0.2 1.5 2.0 1.2 1.0 1.2 1.3 0.8 0.3 -0.4 0.0 -0.8 -0.2 0.2 0.7 0.6 1.3 1.8 1.5 0.9 1.7
1.0 1.1 -0.5 0.7 1.0 0.2 0.2 0.4 -0.3 0.3 0.5 0.2 0.0 -0.1 0.5 0.7 0.2 0.9 -0.1 -0.5 -0.5 0.1 0.1 1.0 0.6 1.2
0.4 -0.4 0.2 0.4 1.2 0.1 0.3 -0.4 -0.1 -0.2 0.1 0.3 -0.1 -0.1 -0.2 0.0 0.0 0.4 0.6 0.8 0.3 0.0 0.0 -0.5 0.9 0.1 0.3 0.4
-0.2 0.0 -0.1 1.0 1.7 0.4 0.5 0.6 1.0 1.1 1.5 1.2 0.5 0.3 -0.1 -0.8 -0.1 0.2 0.6 0.5 2.1 1.8 -0.6 -0.3 0.5 1.1 0.5 0.2
1.3 0.5 0.3 1.0 1.6 1.0 0.0 0.2 -0.5 0.7 0.6 1.0 0.8 1.2 1.7 1.7 0.6 0.5 0.9 0.3 -1.9 -0.4 0.8 0.9 0.8 0.7 1.6 1.3
1.3 0.6 0.2 1.1 1.8 1.2 -0.2 0.2 0.2 0.6 0.5 1.0 0.8 1.0 1.1 0.6 0.1 0.7 -0.7 -0.7 -0.1 0.6 1.2 0.8 0.8 0.9 0.4 0.9
0.6 0.5 0.7 1.0 1.2 1.4 1.5 0.6 0.3 0.3 0.0 0.4 0.5 0.8 1.0 0.5 -0.6 -2.7 -0.6 0.5 0.9 -0.1 0.3 0.5 0.6 0.7 0.4 0.3 0.5 0.4 0.5
1.4 1.6 1.8 2.0 2.1 2.3 2.1 1.9 1.4 0.7 -1.6 -1.6 -0.6 0.4 0.8 1.3 0.9 0.4 0.7 1.0 0.1 0.5 0.5 0.5 0.4 0.5 0.5 1.0 0.8 1.0 0.8 0.8 0.9
1.2 1.1 0.8 0.8 1.2 1.2 1.8 1.9 1.0 -0.9 -2.3 -2.5 -2.8 -0.9 0.8 0.8 1.2 0.3 -1.0 0.6 0.5 0.5 0.3 0.8 1.1 0.7 0.8 0.9 0.1 0.4 0.8 1.0 0.9
1.2 0.6 0.5 1.0 1.0 0.9 1.4 2.3 2.9 1.8 1.6 -3.8 -3.1 0.9 2.0 2.6 1.3 -1.9 0.0 0.8 1.2 1.4 1.4 1.9 1.9 0.8 -0.2 -0.2 0.9 0.8 1.6 2.1
1.3 1.4 1.6 1.3 0.8 1.0 0.6 0.6 1.6 2.1 0.6 -1.2 -0.7 0.5 0.3 0.8 1.3 1.4 0.3 -2.4 0.0 0.1 0.1 0.5 1.5 1.8 1.1 1.4 2.0 0.0 0.3 0.8 1.2 1.0
0.0 0.6 0.0 0.5 0.0 0.3 0.4 0.5 0.4 0.9 0.2 -1.5 0.2 1.1 0.5 0.1 0.7 0.6 0.6 1.2 1.1 0.4 0.8 0.8 0.9 1.0 0.9 0.5 0.7 0.6 -0.2 0.3 0.3 0.6 1.0 0.8
0.1 -0.1 -0.1 0.1 0.3 0.1 0.1 0.4 0.8 0.7 0.2 -0.7 0.2 0.2 0.2 -0.3 -1.0 0.0 0.2 0.4 0.6 0.4 0.6 0.6 0.5 0.7 0.9 0.4 0.4 0.5 0.4 0.1 0.1 0.6 0.6 0.0
-0.2 -0.5 -0.7 -0.7 -0.2 -0.6 -0.4 -0.5 0.1 -0.7 -0.4 -1.1 -0.9 -0.2 -0.2 -0.1 0.1 -0.5 -1.2 -0.8 0.1 -0.2 -0.7 -0.7 -0.8 -0.6 -0.1 -0.8 -1.0 -1.3 -1.1 -0.7 -0.2 0.1 -0.1
-1.8 -2.9 -2.5 -2.3 -2.5 -1.4 -1.5 -2.1 -1.2 -2.0 -1.6 -2.4 -2.6 -1.5 -1.1 -0.7 -1.7 -1.9 -1.4 -1.5 -1.6 -1.6 -2.2 -1.4 -1.0 -0.8 -2.4 -1.4 -2.9 -3.6 -1.5 -1.4 -1.8 -1.7 -1.7 -1.6
-4.1 -4.4 -3.3 -3.6 -4.6 -2.7 -5.4 -5.0 -2.4 -1.0 -2.3 -1.9 -2.7 -5.2 -3.2

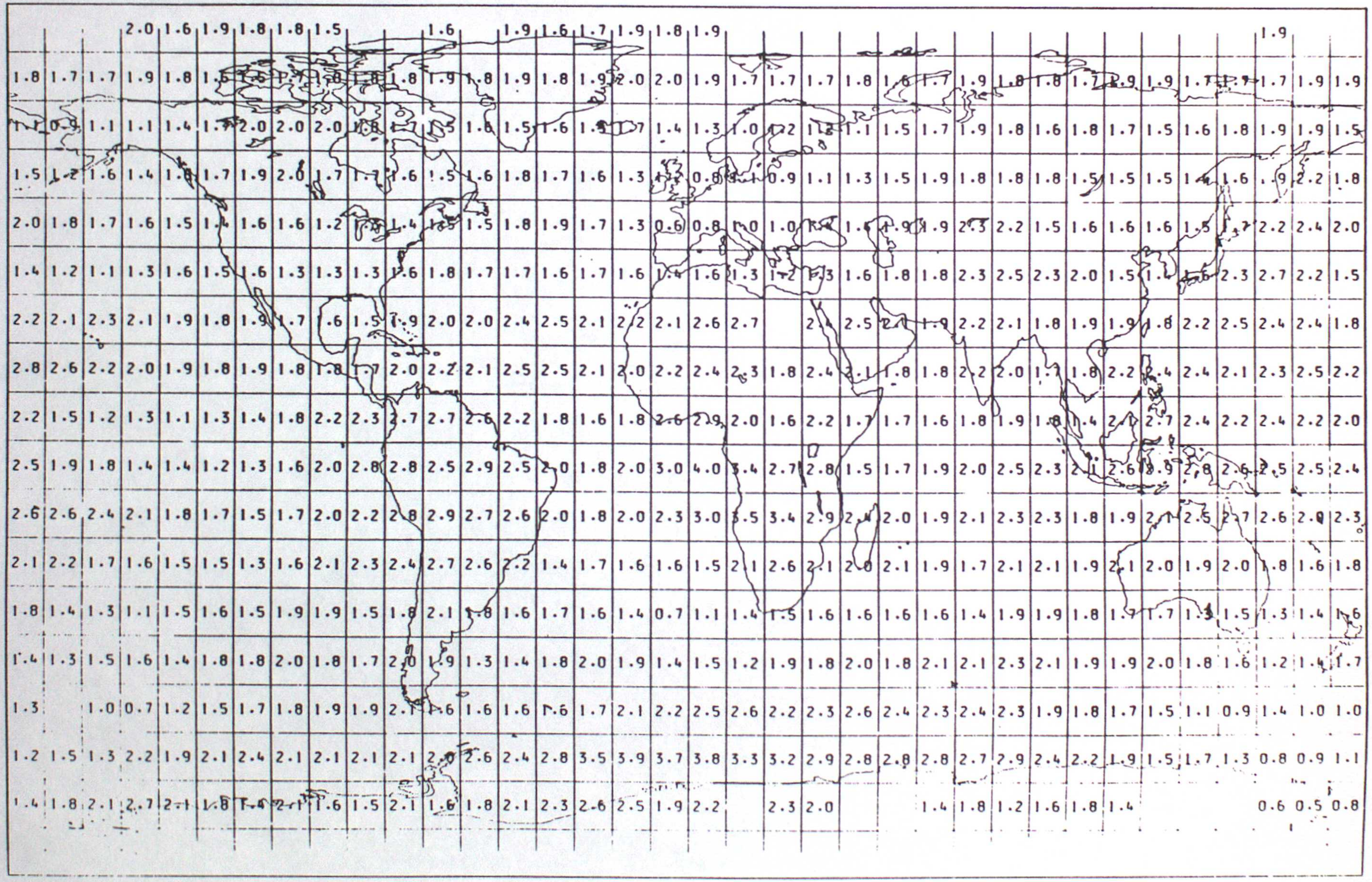
500 KM SATEMS : MEAN O-B TEMPERATURE DIFFERENCES (DEG C) : 100 TO 300 HPA
SEPTEMBER 1993
NOAA-12. USING ALL OBSERVATIONS
VALUES ARE PRINTED WHERE > 30 OBS ARE PRESENT

FIGURE 29



500 KM SATEMS : MEAN O-B TEMPERATURE DIFFERENCES (DEG C) : 30 TO 50 HPA
SEPTEMBFR 1993
NOAA-12. USING ALL OBSERVATIONS
VALUES ARE PRINTED WHERE > 30 OBS ARE PRESENT

FIGURE 30


2.0 1.6 1.9 1.8 1.8 1.5 1.6 1.9 1.6 1.7 1.9 1.8 1.9 1.9
1.8 1.7 1.7 1.9 1.8 1.5 1.6 1.7 1.8 1.8 1.8 1.9 1.8 1.9 1.8 1.9 2.0 2.0 1.9 1.7 1.7 1.7 1.8 1.6 1.7 1.9 1.8 1.8 1.7 1.9 1.9 1.7 1.7 1.7 1.9 1.9
1.1 0.9 1.1 1.1 1.4 1.7 2.0 2.0 2.0 1.8 1.7 1.5 1.6 1.5 1.6 1.5 1.7 1.4 1.3 1.0 1.2 1.2 1.1 1.5 1.7 1.9 1.8 1.6 1.8 1.7 1.5 1.6 1.8 1.9 1.9 1.5
1.5 1.2 1.6 1.4 1.8 1.7 1.9 2.0 1.7 1.7 1.6 1.5 1.6 1.8 1.7 1.6 1.3 1.2 0.8 1.1 0.9 1.1 1.3 1.5 1.9 1.8 1.8 1.8 1.5 1.5 1.5 1.4 1.6 1.9 2.2 1.8
2.0 1.8 1.7 1.6 1.5 1.4 1.6 1.6 1.2 1.3 1.4 1.5 1.5 1.8 1.9 1.7 1.3 0.6 0.8 1.0 1.0 1.2 1.6 1.9 1.9 2.3 2.2 1.5 1.6 1.6 1.6 1.5 1.7 2.2 2.4 2.0
1.4 1.2 1.1 1.3 1.6 1.5 1.6 1.3 1.3 1.3 1.6 1.8 1.7 1.7 1.6 1.7 1.6 1.4 1.6 1.3 1.2 1.3 1.6 1.8 1.8 2.3 2.5 2.3 2.0 1.5 1.4 1.6 2.3 2.7 2.2 1.5
2.2 2.1 2.3 2.1 1.9 1.8 1.9 1.7 1.6 1.5 1.9 2.0 2.0 2.4 2.5 2.1 2.2 2.1 2.6 2.7 2.4 2.5 2.1 1.9 2.2 2.1 1.8 1.9 1.9 1.8 2.2 2.5 2.4 2.4 1.8
2.8 2.6 2.2 2.0 1.9 1.8 1.9 1.8 1.8 1.7 2.0 2.2 2.1 2.5 2.5 2.1 2.0 2.2 2.4 2.3 1.8 2.4 2.1 1.8 1.8 2.2 2.0 1.7 1.8 2.2 2.4 2.4 2.1 2.3 2.5 2.2
2.2 1.5 1.2 1.3 1.1 1.3 1.4 1.8 2.2 2.3 2.7 2.7 2.6 2.2 1.8 1.6 1.8 2.6 2.9 2.0 1.6 2.2 1.7 1.7 1.6 1.8 1.9 1.8 1.4 2.1 2.7 2.4 2.2 2.4 2.2 2.0
2.5 1.9 1.8 1.4 1.4 1.2 1.3 1.6 2.0 2.8 2.8 2.5 2.9 2.5 2.0 1.8 2.0 3.0 4.0 3.4 2.7 2.8 1.5 1.7 1.9 2.0 2.5 2.3 2.1 2.6 2.9 2.8 2.6 2.5 2.5 2.4
2.6 2.6 2.4 2.1 1.8 1.7 1.5 1.7 2.0 2.2 2.8 2.9 2.7 2.6 2.0 1.8 2.0 2.3 3.0 3.5 3.4 2.9 2.4 2.0 1.9 2.1 2.3 2.3 1.8 1.9 2.1 2.5 2.7 2.6 2.0 2.3
2.1 2.2 1.7 1.6 1.5 1.5 1.3 1.6 2.1 2.3 2.4 2.7 2.6 2.2 1.4 1.7 1.6 1.6 1.5 2.1 2.6 2.1 2.0 2.1 1.9 1.7 2.1 2.1 1.9 2.1 2.0 1.9 2.0 1.8 1.6 1.8
1.8 1.4 1.3 1.1 1.5 1.6 1.5 1.9 1.9 1.5 1.8 2.1 1.8 1.6 1.7 1.6 1.4 0.7 1.1 1.4 1.5 1.6 1.6 1.6 1.6 1.4 1.9 1.9 1.8 1.7 1.7 1.3 1.5 1.3 1.4 1.6
1.4 1.3 1.5 1.6 1.4 1.8 1.8 2.0 1.8 1.7 2.0 1.9 1.3 1.4 1.8 2.0 1.9 1.4 1.5 1.2 1.9 1.8 2.0 1.8 2.1 2.1 2.3 2.1 1.9 1.9 2.0 1.8 1.6 1.2 1.4 1.7
1.3 1.0 0.7 1.2 1.5 1.7 1.8 1.9 1.9 2.1 1.6 1.6 1.6 1.6 1.7 2.1 2.2 2.5 2.6 2.2 2.3 2.6 2.4 2.3 2.4 2.3 1.9 1.8 1.7 1.5 1.1 0.9 1.4 1.0 1.0
1.2 1.5 1.3 2.2 1.9 2.1 2.4 2.1 2.1 2.1 2.1 2.0 2.6 2.4 2.8 3.5 3.9 3.7 3.8 3.3 3.2 2.9 2.8 2.8 2.8 2.7 2.9 2.4 2.2 1.9 1.5 1.7 1.3 0.8 0.9 1.1
1.4 1.8 2.1 2.7 2.1 1.8 1.4 2.1 1.6 1.5 2.1 1.6 1.8 2.1 2.3 2.6 2.5 1.9 2.2 2.3 2.0 1.4 1.8 1.2 1.6 1.8 1.4 0.6 0.5 0.8

APPENDIX I

1. The gross error limits for observation minus background differences of geopotential height in Table 4 are:-

Level (hPa)	Geopotential height (metres)
1000	100
850	100
700	100
500	150
400	175
300	200
250	225
200	250
150	275
100	300
70	375
50	400
30	450

The weighted RMS values used in Table 4 are calculated using the following weights:-

Level (hPa)	Weight
1000	3.70
850	3.40
700	2.90
500	2.20
400	1.90
300	1.60
250	1.50
200	1.37
150	1.19
100	1.00
70	0.87
50	0.80
30	0.64

2. The gross error limits for observation minus background differences of windspeed in Table 5 are:-

Level (hPa)	Windspeed m s^{-1}
1000	35
850	35
700	40
500	45
400	50
300	60
250	60
200	50
150	50
100	45